

BPW BUTANE-PROPANE News

A CHILTON  PUBLICATION

JUNE 1961

Flame Cultivation—
one year later

HEADQUARTERS FOR L.P. GAS INFORMATION SINCE 1931



**DIAL
TULOMA
AND GROW**

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double life in HACKNEY double bottom cylinders

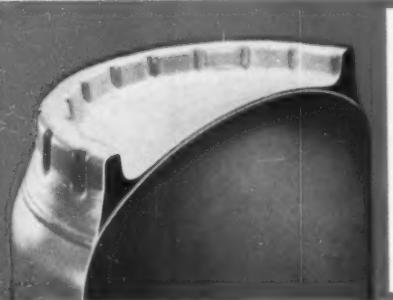
Resists rust and corrosion — smooth, rounded contour of the second full bottom head leaves no place for rust or corrosion to form. Cleaning and painting are less time-consuming.

Eliminate crushed foot rings — integral fluted foot ring and double-bottom head construction, welded all around, add the strength needed to withstand rough handling...save costly repair and foot-ring replacement.

Won't pack mud, snow or ice — broad, shallow, fully rounded bottom offers no chance for accumulations of compacted materials.

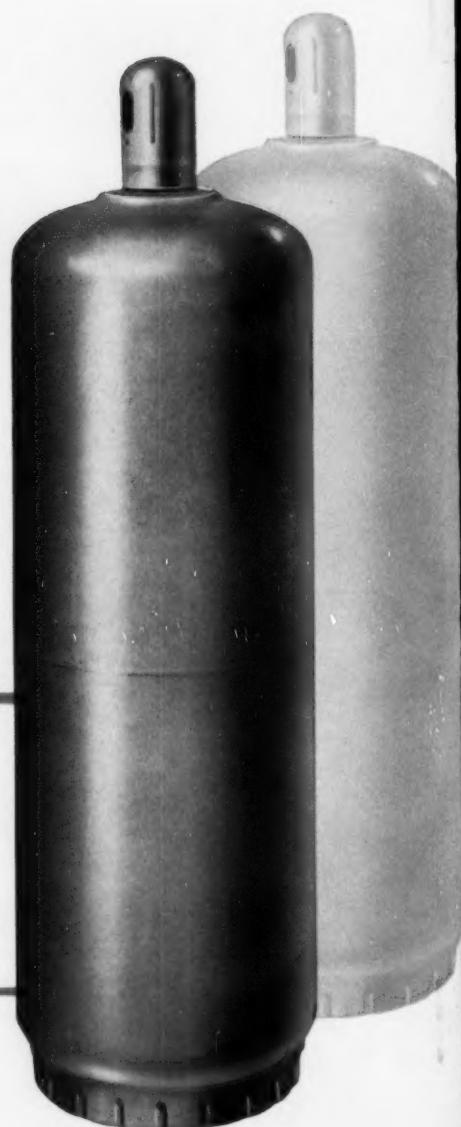
Outlast other cylinders by years — Hackney DOUBLE-BOTTOM head cylinders end bottom failure for many years beyond the life of conventional cylinders.

Save you time and money — with double the life, you save in maintenance time, repainting dollars, and replacement costs!



Cross section shows how Hackney patented DOUBLE-BOTTOM head construction is stronger, doubles cylinder life, and reduces maintenance time and replacement costs.

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Manufacturer of Hackney Products

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LP-GAS CONTAINERS FROM ONE POUND TO 30,000 GALLONS





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BUTANE-PROPANE News is published monthly. Copyright 1961 by Chilton Company, Chestnut and 56th Sts., Philadelphia 39, Pa. Subscription service: United States, U.S. possessions and Canada: \$6 per copy, one year, \$2; two years, \$3. Mexico, South and Central America, Caribbean areas: one year, \$3; two years, \$5. All other countries, \$10 per year. Accepted as controlled circulation publication at Philadelphia, Pa. Member of Liquefied Petroleum Gas Association, National L. P. Gas Council, National Fire Protection Association. Available on microfilm.

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BEHIND THE SCENES

A history lesson and a new LPG outlet

IT MAY BE NOTHING MORE THAN COINCIDENCE, but on this 100th anniversary of the Civil War the man who was just elected to the presidency of the LPGA is a Southern gentleman with deep roots in the Confederacy.

In fact, Otto Williams was once president of a railroad that had figured prominently in a great victory for the South.

Here's how the story came to light:

Always on the prowl for the unusual, as well as the significant, the editors decided to investigate a report that Bottled Gas Corp. of Virginia had moved its Fredericksburg offices to a railroad station. Seemed a little unusual, to say the least. So we wrote Executive Vice President Robert E. Leitch for an explanation.

Here's what we learned. Bobby's boss, E. O. N. Williams, was president of the railroad, the Virginia Central, from 1932 to 1940. His father, who bought the railroad in 1925, ran it until his death in '32. And now, Otto's younger brother runs it.

Unfortunately, there now isn't much left for Otto's brother to run, just one mile of track serving various industries around Fredericksburg by connecting with the Richmond, Fredericksburg, and Potomac Railroad, which runs up to Washington. Originally, however, Vir-

ginia Central had 40 miles of narrow gauge track. It was in telling us about this origin that Bobby gave us the history lesson.

"You Californians," he wrote, "probably do not know anything about Civil War history (well!), but the fact is that the Northern troops had a hard time maneuvering in the dense forest at Chancellorsville during the Wilderness Campaign and this hindered them greatly. Construction on the roadbed had begun in 1856, but was not completed when the war started. It is a historical fact that General Stonewall Jackson used the cleared roadbed to move his troops with great speed. His surprise attack helped him defeat Gen. Hooker at Chancellorsville."

After the war—in 1876, to be exact—Virginia Central built a station in Fredericksburg. When that building burned down in 1904, a similar one was erected to replace it. It served as a depot until 1938, when Otto discontinued the 40-mile run. It has since been an office for the railroad and a showroom for an affiliated farm machinery business.

Bottled Gas was in another railroad-owned building when it was decided that larger quarters were needed. The old depot was the obvious answer. Included in the relatively minor remodeling that followed were the installation of a new central heating and air condi-



Before and after shots of the new Bottled Gas Corp. of Virginia home show the tremendous transformation wrought by a little fixing up.

From the world's oldest propane tank manufacturer



MASTER ships the finest of....
PROPANE TANKS



All over the world by truck • barge • ship • rail



You can't buy a better propane tank than those fabricated by Master Tank & Welding. No wonder, then, that Master tanks are in demand the world over. From the central locations in the United States, of Quincy, Illinois, and Dallas, Texas, Master is shipping tanks all over the world by truck, barge, ship and rail to those sections beyond the gas mains where propane is being used.

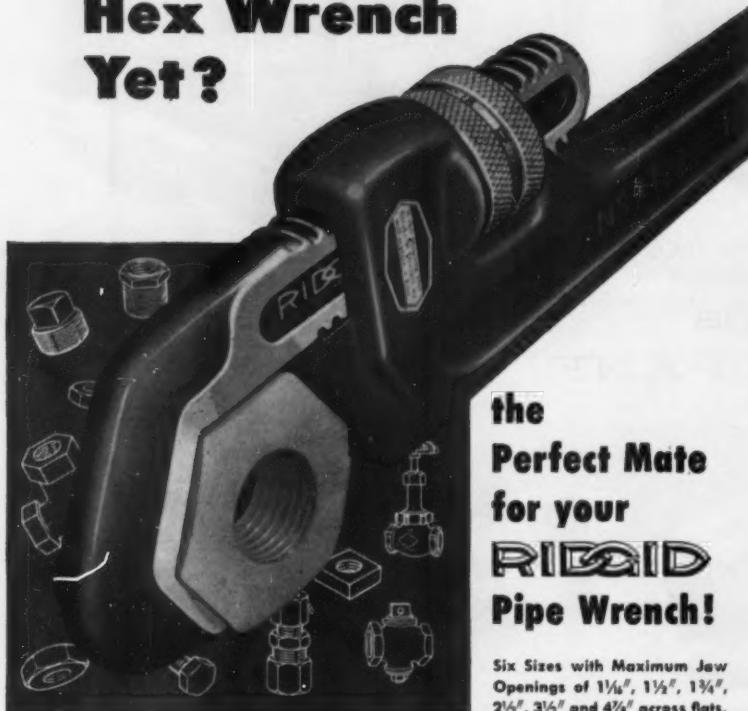
Master's experience spans 23 years in steel fabrication. This experience is your assurance of the ultimate in safety and performance built into every Master tank.



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Perfect Mate
for your
RIDGID
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Six Sizes with Maximum Jaw
Openings of $1\frac{1}{4}$ ", $1\frac{1}{2}$ ", $1\frac{3}{4}$ ",
 $2\frac{1}{4}$ ", $3\frac{1}{2}$ " and $4\frac{1}{8}$ " across flats.

Finest of All Adjustable Smooth-Jaw Wrenches

MORE GRIPPING POWER...
for all nuts. Puts a wrap-around grip on hexes that just won't slip. Because you're pulling with at least three flat sides at once, you'll never round off shoulders. Works on square nuts, valve packing nuts, unions and gas cocks and flat shapes, too. Smooth jaws won't even mar polished or plated surfaces.

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built good and solid. Thin but extra-strong jaws slip into tight places. The first time you use a hex wrench you'll know that here's a wrench you'll use for a long, long time. It's every bit as rugged as your familiar **RIDGID** Pipe Wrench.



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Big Jaw, Short Handle for Sink and
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From experience you know it's easier to work
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Behind the Scenes

tioning system. New windows, shutters, lights, porches and paint, completed the transformation that has caused "quite a bit of conversation in Fredericksburg . . . the boyhood home of George Washington."

Thanks, Bottled Gas Corp. of Virginia—for a good idea for an LPG dealer's place of business.

And thanks, Bobby, for the history lesson.

On this, the 100th anniversary of the start of the Civil War, we think it only fitting that we offer ex-railroader Williams and his crew many "high-ball" years down by the historic Virginia Central's station. ■

BACK TALK

LPG-men—"worry warts?"

Bascom, Ohio

It seems that our leading industry magazine, BPN, cannot have an issue in the mail these days without an article on the growing threat of the "kilowatters."

You may rest assured these boys are getting a "large charge" over the nationwide concern of electric heat from various fuel industries. We are doing just exactly what they would want us to do. The "kilowatters" think we're doing a superb job of selling for them, unwittingly of course, by the constant hammering and yammering about what we can do to halt the electric heating threat.

We are spending far too much time worrying about what "Reddy Kilowatt" is doing and not nearly enough time telling our prospects about LPG. All we have accomplished is a comparison list that is of no value when approaching a prospect.

Something has happened to the old selling ways. The LPG-men seem to be a group of "worry warts." What's happened? Mass hypnosis or are we just getting old? Personally, I think I'll forget about the other guy's products and start doing a lot of yammering and hammering about what I have to offer.

R. L. WILKINS
Mulligan & Johnson
Propane Gas Service, Inc.

Household Quiz!

... what fuel heats water FASTEST?

ANSWER — TRUFLAME LP-Gas, of course. TRUFLAME can work miracles in heating your water much faster than any other fuel. No waiting around for a storage of water when you need it. Depend on TRUFLAME LP-Gas for heating water fast.

And You'll be Money Clever.

1. Safety — it's a must for a home. 2. Economy — it's a must for a budget. 3. Efficiency — it's a must for a modern home. 4. Dependability — it's a must for dependability.

SAVE TIME

HEAT WATER WITH SINCLAIR TRUFLAME LP-GAS

ANSWER

ANSWER — SINCLAIR TRUFLAME LP-GAS. SINCLAIR TRUFLAME LP-GAS is the answer to your heating problems. SINCLAIR TRUFLAME LP-GAS is the answer to your heating problems. SINCLAIR TRUFLAME LP-GAS is the answer to your heating problems.

WEIRD'S BUTANE

SHEPPARD-MILLS BUTANE

YOUR PATH TO EASIER, MORE PLEASANT COOKING WITH Truflame LP-Gas

COOK FASTER

COOK CLEANER

MORE COOKING SPEEDS

SMOKELESS BROILING

BUILT-IN DESIGNS

AUTOMATIC

LOW COST

Appliance Sales & Service

122 S. 5th St.

MEMBER L.P.G.A.

MEMBER NATIONAL LP-GAS COUNCIL

Advertising Can SELL for You, Too

Pictured here is just a small sample of newspaper advertising being used by Sinclair TRUFLAME LP-Gas Distributors. These ads, plus radio spots, roadside signs, colorful decals and other types of promotion are getting results for many Sinclair distributors.

You can get in on this tested advertising program, too. As a Sinclair TRUFLAME LP-Gas distributor you may participate in one of the strongest and best 50/50 advertising programs in the industry. So, wire or write today for complete information.



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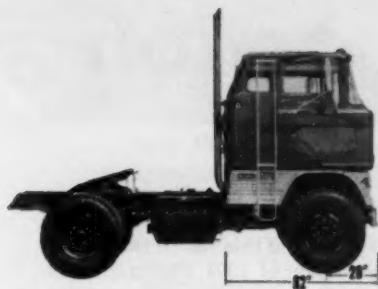
THE NEWEST REASON TO MAKE
YOUR NEXT TRACTOR A FORD:

ALL-NEW FORD
H-SERIES
GAS OR DIESEL



FORD DIVISION, *Ford Motor Company*,

Ford H-Series tractors offer a choice of five Super Duty V-8's or four proven Cummins Diesels for maximum performance, economy and durability! Over 500 engine-transmission-axle combinations provide "job-fitting" economy on any run.



New Ford H-Series tractors have a short 28-in. BA for hauling maximum legal loads in most "bridge formula" states. And their compact 82-in. BBC dimension accommodates longer high-cube trailers. For greater payloads within their 76,800-lb. maximum GCW range, strong lightweight components are used wherever consistent with maximum durability. Extra-hi-tensile steel frames, fiberglass cab skirts, aluminum steering gear housing, and optional aluminum disc wheels, transmission cases and fuel tanks are typical examples of Ford's weight-saving design.

Ford H-Series models are quality-built to the most exacting standards in the industry. They're the only tractors with gas engines so dependable they're dealer-warranted for 100,000 miles. And maintenance-engineered design means fewer downtime delays . . . lower maintenance costs.

SEVEN MORE REASONS

WHY IT'S GOOD BUSINESS TO DO BUSINESS WITH FORD!

You save from the start with Ford's traditionally low prices, and your savings continue with low operating and maintenance costs. These facts are documented by certified test reports from America's foremost independent automotive research firm. Ask to see these reports. They're on file at your Ford Dealer's.

In addition to these dollar-and-cents savings, the following bonus benefits are yours with Ford Trucks:

1. Rigid quality controls give you the strongest safeguard of truck reliability ever. Modern, *exclusive-truck* manufacturing facilities, with emphasis on quality every step of the way, are designed to give you a Ford Truck that is as free from defects as a truck can be. Tangible results of these high standards are Ford's new warranties.

2. Exclusive 100,000-mile warranty (or 24 months) on 401-, 477- and 534-cu. in. Super Duty V-8's is the most liberal in the industry. Each major engine part (including block, heads, crankshaft, valves, pistons, rings), when engine is used in normal service, is warranted by your dealer against defects in material or workmanship for 100,000 miles or 24 months, whichever comes first. The warranty covers full cost of replacement parts . . . full labor costs for first year or 50,000 miles, sliding percentage scale thereafter.

3. 12,000-mile warranty (or 12 months) on all 1961 Ford Trucks of every size is further evidence of the confidence Ford has in its quality controls. Each part, except tires and tubes, is now warranted by your dealer against

defects in material or workmanship for 12 months or 12,000 miles, whichever comes first. The warranty does not apply, of course, to normal maintenance service or to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points.

4. Special fleet financing can be arranged by your Ford Dealer. It's available for owners of two or more trucks, and provides the opportunity to precisely tailor payments to your income patterns or depreciation schedules. This fleet-fitted financing offers substantial savings and frees your working capital.

5. Sales engineers and service specialists in 36 district offices are on call to solve special truck problems. Working with both dealers and customers, these experienced truck men represent another extra step Ford takes to provide your continued satisfaction.

6. Replacement parts depots at 26 strategic locations across the country quickly supply needed parts from ample stocks. Ford's entire supply system is geared to give you faster service and reduce costly downtime . . . wherever you are.

7. 6,800 Ford Dealers, including 280 specialized Heavy Duty truck dealers, can keep your trucks ready to go wherever they go. From coast to coast, fast Ford service—gas and Diesel—is always close at hand.

From Super Economy pickups to Diesel-powered tractors, you can now fill every truck need up to 76,800 pounds GCW with a modern, money-saving Ford Truck.

QUALITY-BUILT...MAINTENANCE-ENGINEERED

**FORD
TRUCKS
COST LESS**

The industry in action

ASSOCIATIONS

API might help fight electric heat

"We would lend any support we could to a co-operative advertising program or anything else that would effectively help to counteract the threat of electric heat."

So said Frank Porter, president of API, in answer to a question put to him by BPN during a press conference last month in Chicago. The parley was held in conjunction with Porter's appearance at the LPGA national convention.

Council's LPG book—"sales tool"

"L. P. Gas on the Farm" is rapidly becoming the industry's "All-American" sales tool.

Since publication, the book has played these parts, among others: an industry spokesman before a state legislative tax committee, a securities salesman for LPG companies, a reference for county agricultural extension agents.

The National L. P. Gas Council recently mailed 2800 copies of the book to the nation's county agricultural agents. Soon the Council will mail 10,000 copies to vocational agricultural teachers. Already, 122,450 books have been bought by Council members.

Other Council activities include promotion runs during May and June in *Farm Journal* and *Farm*



GAMA recently elected officers at its 26th annual convention in Boca Raton, Fla. They are: W. G. Hamilton, Jr. (second from left), American Meter Co., president; J. F. Ray (left), General Controls Co., first vice-president; J. J. Decker (second from right), American Standard, second vice-president. Harold Massey (right) continues as managing director.

and Ranch offering 163 prizes. Five hundred and one LPG appliances will be offered this fall in the second business building promotion of 1961. Philip S. Harper, Jr., of Harper-Wyman Co., Chicago, reported that 40 prints of the movie "Living Pleasure," have been bought by members.

Binghamton maps "ad co-op" program

Twenty-eight L. P. Gas marketers who operate in and around Binghamton, New York, are meeting regularly to map out a cooperative program. They have contacted the Binghamton Gas Utility, division of Columbia System, to work out a gas industry advertising program.

Robert Morgan, Morgan's Gas Service, Afton, New York, is president of the group. Bill Cope-land, Cylinder Gas, Inc., Binghamton, is secretary.

MARKETERS

Metrogas sells Wisconsin plants

Metrogas, a multi-state operating company headquartered in Chicago, is pulling out of Wisconsin.

Last February, its utility affiliate, United Cities Gas, sold its natural gas properties in the state to Milwaukee Gas Light Co., which is expanding its holdings throughout the state. In May, Metrogas sold its LPG plants at Sparta, Tomah, Waupaca, New Lisbon, and Mauston to the same company.

Metrogas' most recent acquisition was Blue Ridge Gas & Appliance Co., Hendersonville, N. C., purchased from Luther Horne last September.

Cal Liquid purchases Liquefuels

California Liquid Gas Corp., Sacramento, Calif., recently purchased the assets of Liquefuels, Inc., of Montana and Wyoming. With headquarters in Billings, Montana, the new companies will operate as the Intermountain Division, managed by Steve Mickulin. Hayden Thomas will act as assistant.

The Montana propane companies and managers are: Twin Bridges, Andre Morris; Ennis, Curtiss Powell; Broadus, Fred Gali; Ashland, Louis Hornseth; Bozeman, Bob Chester; Livingston, Elmo Ruegamer; Townsend, Leonard Lavender; West Yellowstone, Robert Leithead; Ekalarka, Wayne Fleming; Plevna, Rex Jones.

The Wyoming propane companies are: Ralston, Edward Eden; Greybull, Jack Lindse.

Cal Liquid also purchased Winnemucca Propane

YOU CAN COUNT ON POWELL VALVES

Performance proves it, year after year—you can count on Powell Valves to help you solve the toughest flow control problems handling butane, propane and other hydrocarbons.

This truly dependable performance results from many things—among them Powell's engineering know-how, accumulated during 115 years of valve manufacture . . . and tested designs to meet the

requirements of liquified petroleum gas service, approved by Underwriters' Laboratories, Inc.

Then, too, you can count on getting the Powell Valve you need, when you need it. That's because Powell maintains a network of distributors backed up by factory inventories, warehoused "ready to go."

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400-pound W.O.G. Steel Globe Valve—
Fig. 86190. Union bonnet. Special composition disc, renewable cast nickel-bronze seat ring. Sizes, $\frac{1}{4}$ " through 2". Steel angle and lift check valves also available.

400-pound W.O.G. Bronze Horizontal Lift Check Valve—Fig. 8158. Screwed cap. Integral seat. Renewable, special composition disc, accurately guided. Sizes, $\frac{1}{4}$ " through 3".

400-pound W.O.G. Bronze Globe Valve—
Fig. 8102. Union bonnet. Special composition disc, renewable nickel-bronze seat ring. Sizes, $\frac{1}{4}$ " through 3". Angle valves can also be furnished.

115th year of manufacturing industrial valves for the free world

POWELL LPG VALVES

THE WM. POWELL COMPANY CINCINNATI 22, OHIO





NEWS PARADE

The industry in action

Co. (Nevada) from its former owner, Woodrow Eriksen. Ben Aldous will be the new manager.

REGEIMBAL: WASHINGTON

LPG firms hit by wage-hour law

The new federal minimum wage-hour law will cover some L.P. gas firms. Even those now paying all help more than the new minimum will be affected by the government's reporting and inspection requirements.

The new law goes into effect Sept. 5. Retail and service firms grossing more than \$1 million a year and buying at least \$250,000 worth of goods a year across state lines will be covered. A special provision, however, exempts single units of a chain which gross under \$250,000, even if the chain as a whole grosses over \$1 million.

Firms which are newly covered will have to pay all workers at least \$1 an hour. In 1964, the minimum for them will go to \$1.15 an hour, and in 1965 to \$1.25 an hour. Overtime pay (time-and-a-half) would be required for more than 44 hours in 1963, for more than 42 hours in 1964, and for more than 40 hours in 1965.

For firms now covered by the law, the minimum wage will go to \$1.15 in September and \$1.25 in 1963. Overtime is required for more than 40 hours.

Retail salaried workers who receive commissions are exempt from overtime if over one-half of their income is in commissions and they earn more than \$1.50 an hour on the average.

There is a special exemption from overtime for independent petroleum jobbers who sell less than \$1 million a year, make 75 percent of their sales within one state, and have no more than 25 percent of their sales to bulk distributors.

Student workers may be paid less than the mini-



The Pittsburgh-Des Moines Steel Co. (Pittsburgh) recently completed building 45 trailer tanks which are being used to transport propane from various terminals of the Mid-America pipeline. Each of these 10,000-gal tanks is 7 ft 4 1/8 in. OD and from 35 to 40 ft long.

mum in retail trades with a certificate issued by the U. S. Secretary of Labor if they are in jobs not ordinarily given to full-time workers.

Congress hears Kentuckians' story

The Kentucky L.P. Gas Association is spearheading a drive to get each state association in close contact with its elected officials. As part of its own political action program, the group met with members of the Kentucky congressional delegation in mid-May in Washington.

Purpose of the breakfast meeting was to honor Dr. Frank J. Welch, new Assistant Secretary of Agriculture for federal-state relations. He was honored for his service to the industry while dean of the University of Kentucky Agriculture College.

Rep. William N. Natcher was also honored for helping the Association make certain that L.P. gas was included in the energy studies by the new National Tobacco Research Center at the University of Kentucky, in which Dr. Welch played a major role.

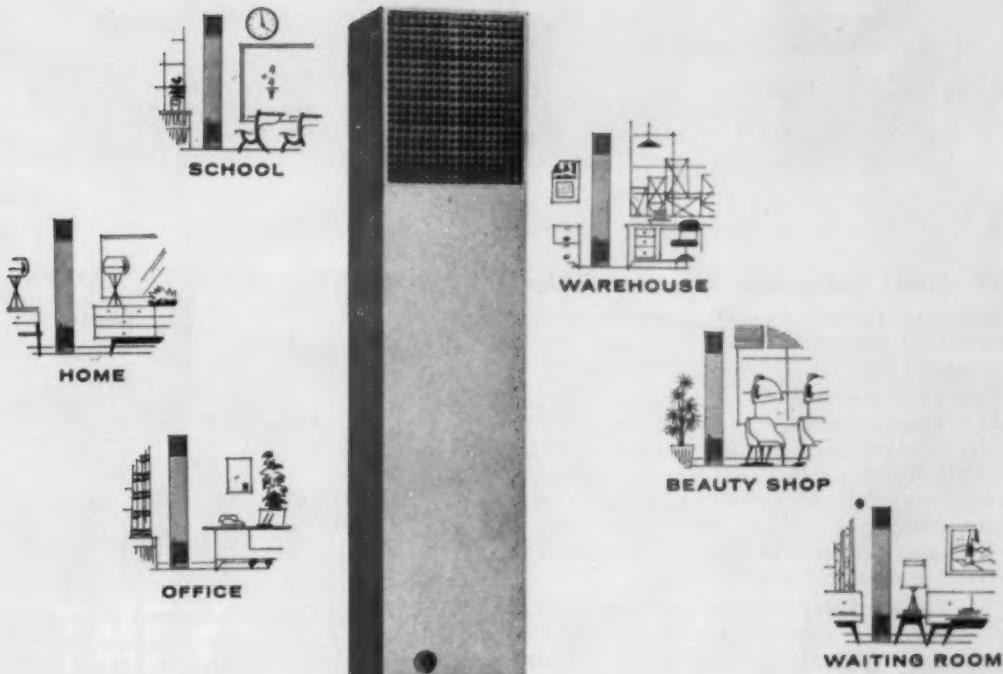
Lee C. White, assistant special counsel to President Kennedy was cited for his help in setting up the research center while administrative assistant to Sen. John S. Cooper of Kentucky. It was announced that Sen. Cooper would also be honored later.

Officers of the association called on various government officials while in Washington.

The group is encouraging other state associations to similarly keep in close contact with their elected officials. The Kentucky Association does not plan regular meetings, but meets with them on any suitable occasion. Members stress that they don't want special favors, but do want to be considered in all programs and activities of the government.

As evidence of the value of such contacts, Frances L. Holliday, executive secretary, was told by John A. Baker, director of Agriculture Credit Service for the U. S. Agriculture Department, a guest, that a bill would be introduced in Congress to permit business firms to borrow money from the federal government at 4 1/2 percent interest, and that L.P. gas firms would be included. He is optimistic about the measure's chances, she says.

The program was conducted by William D. Johnson, Association President, and M. J. Crafton, a director. Other guests included Sen. Thruston Morton, Reps. Frank A. Stubblefield, Frank W. Burke, and Eugene E. Siler; Dr. E. T. York, Jr., Director of the Federal Extension Service (Agriculture Department), Eunice Haywood, Director of the Department's home economics division, and Philip Aylesworth, assistant to Dr. Welch.



FAR BETTER
THAN ORDINARY
GRAVITY
WALL HEATERS

COSTS LOTS LESS
THAN CENTRAL
FORCED-AIR
HEATING SYSTEMS

RIGHT IN THE MIDDLE WHERE THERE'S MONEY TO BE MADE

- ★ It's vented for safety. (Vent is concealed.) ★ Hides in the wall, takes no space at all. (Only 14" wide by 10" deep.) ★ You offer floor-level heat in one, two, or three directions.
- ★ Only a small grille shows on one side if you use fully-hidden installation method. ★ Installs simply—the simplest, by just putting it against a wall. ★ Offer a choice of single or two-speed models.

You can bet DAY & NIGHT has no special ax to grind in this area. DAY & NIGHT makes the best of both other types of heating equipment. But there's that fertile market in between where you can make a healthy profit. It's the market that won't settle for "just heat" in a merely adequate, low-cost unit—yet can't (or won't) pay for the long-run ductwork required by central forced-air systems. Where price is the prime consideration, you can sell the standard, single-speed model. The two-speed FA Panelray model should be your big seller. Its *normal* setting holds operation to a low flame, low speed level, stretching use of fuel and power over longer period for more even temperature. *High* setting allows burner and fan to respond to thermostat regulation for full-speed, full-flame operation.

It fits your middle market perfectly!

IT'S THE NEW

DAY & NIGHT 60 FA PANELRAY

For complete installation specifications, write to:

DAY & NIGHT MANUFACTURING COMPANY 855 ANAHEIM-PUENTE ROAD, LA PUENTE, CALIF.



NEWS PARADE

The industry in action

JFK would tax co-ops—but not REAs

President Kennedy is asking that the tax loophole which gives cooperatives a competitive advantage be closed.

The President has asked Congress to require that all co-op earnings be taxable either to the co-op or to the patrons. He would tax the patron for all refunds or dividends whether in scrip or cash, by a withholding system similar to wage withholding.

He wants Congress to continue the present tax exemption for rural electric co-ops.

The President also proposed a new tax break for investment in equipment. A firm remodeling, expanding, or modernizing, could take a tax credit up to 10 per cent of the first \$5,000 it spent; 6 per cent more for spending between 50 per cent and 100 per cent of current depreciation, and 15 per cent for investments over 100 per cent of depreciation allowances.

FTC to scrutinize mergers

Firms planning to merge will find themselves in the hands of the Federal Trade Commission if Congress approves the pending pre-merger notification bill. The bill calls for notification of intent to merge at least 60 days before if assets of firms top \$10 million. This gives FTC time to investigate, decide whether the merger is in the best interests of the economy. Catch is that FTC would also have the power to seek a court injunction against firms planning to merge if the probe takes more than 60 days.

WASHINGTON BRIEFS

Small firms in "distressed" farm or industrial areas can now borrow money at only 4 percent interest. Small Business Administration has cut the rate on its loans in high unemployment areas as a recovery measure. Rate in other areas remains at 5½ percent.

New lower rates on jumbo tank car shipments of L. P. gas in certain areas are under investigation by the Interstate Commerce Commission. The low rates involve minimum shipments of from 18,500 gallons to 30,000 gallons between Kansas and Missouri and the Southwest. Some shippers and the Western Tank Truck Carriers had protested the rates. The ICC did not suspend them, as it could have, but let them go into effect subject to refund while it studies their effect on competition.



This single barrel propane delivery unit with a 4495 cu. ft. capacity was recently produced by Master Tank and Welding Co. (Dallas, Texas, and Quincy, Ill.). The tank is fabricated of high tensile T-1 steel. It is designed for street side delivery, and when loaded, will weigh under 40,000 lbs. The unit was custom engineered for the rugged foothills of the Ozarks.

A firm becomes subject to federal business regulation simply by advertising in a newspaper or station which carries its message across state lines. A District court has upheld the Federal Trade Commission's contention that a firm is in interstate commerce if its sales message goes across a state line. The decision may be reviewed by the U. S. Supreme Court.

SUPPLIERS

Textron acquires Sprague Meter

Textron Inc. of Providence, R. I., recently acquirers of gas meters and regulators, has plants in a cash transaction.

Sprague, one of the nation's oldest manufacturers of gas meters and regulators, has plants in Bridgeport in Anderson, Indiana; Germantown, Pa.

The company will operate as a division under the name of Textron. William Haist, Jr., will continue as president of Sprague.

A. O. Smith expands distribution

The consumer products division of A. O. Smith Corp., Kankakee, Ill., is expanding its distributor network. It now has 238 distributors in 50 states.

The firm's residential units production is up 8 per cent with nearly 30 per cent of the current



THEY HAVE TO TAKE RISKS...

you can't afford to...

These men take risks, sure...but never with their equipment. In their line of work—and, in yours—cheap, so-so equipment is downright false economy.

Take a small thing like an ordinary LP-Gas pigtail, for example. Scale formations can build up inside the tubing, flake off, and cause high regulator lock-up and other service problems...particularly on cylinder systems where the pigtails are flexed when changing cylinders. Cheap pig-

tails are expensive...they save you pennies in price, cost you dollars in profit-robbing service calls.

The new Rego tin-lined pigtails eliminates such problems. It has an inseparably-bonded tin lining to prevent the formation of trouble-causing copper sulphide. Check the features below. You'll see how Rego builds reliability into every product.



NEW SOLDERLESS TIN-LINED REGO 112 SERIES PIGTAILS

- **STRENGTH.** Unique solderless joining of tubing and connecting nipples insures uniform strength of copper tubing.
- **NIPPLE HARDNESS.** POL nipple is not annealed by the intense heat of silver soldering.
- **LONGER LIFE.** Hard POL nipple resists coning during make-up to cylinder valves.
- **SAFETY.** With no soldered joints, pigtails withstand higher temperatures without leakage in case of fire.
- **NO SERVICE PROBLEMS.** Inseparably-bonded tin lining prevents copper sulphide formation in tubing, POL x POL, or POL x $\frac{1}{4}$ " Inverted Flare connections. 18" length, $\frac{1}{4}$ " O.D. tubing, $\frac{1}{8}$ " hex nuts.

REGO®

LP-Gas Equipment
First...Foremost...Finest

For complete details and prices write:

The Bastion-Blessing Company
4201 West Peterson Avenue
Chicago 46, Illinois, Dept. 31-F



The industry in action

volume in deluxe models. March orders this year were 13 per cent ahead of March 1960.

SUPPLY & TRANSPORTATION

Competition keen for Albertan line

Alberta Gas Products System of Canada is seeking a permit to gather and export natural gas liquids. The firm has applied to the Alberta Conservation Board for permission to build a 725-mile pipeline from Edmonton Alberta, to Caraway on the international border. It would connect with facilities of Continental Oil of Delaware.

Other applicants seeking permits are Interprovincial Pipe Line, The Hudson Bay Oil and Gas, the Pembina Pipe Line, the Hydro-Carbon Pipeline and Provincial Products Pipelines.

Three producers expand

Union Texas Natural Gas Corp. recently announced the completed expansion of its Eunice, La., plant. Production will total approximately 307,000 gals. of ethane and 550,000 gals. of natural gasoline and LPG.

Another plant on Tull stream is Skelly Oil's Mineola Gasoline Plant in Dodge City, Kan. The design capacity is 25 million cu ft of gas per day at 700 psig.



Gabor Szekele, field service man, and Garth Kennedy, vice president of Corken's Inc. (Oklahoma City, Okla.), explain the fine points of one of their compressors being shipped to Tokyo Boeki Ltd. for the Japanese LPG industry. Visiting the factory are Mynoru Watanabe (seated) of Tokyo Boeki Ltd. and K. Kashima (standing at right).

Continental Oil of Houston recently revealed plans to construct a \$1,750,000 natural gas products plant at Hennessey, Okla. The plant, which will have a processing capacity of 30 million cu ft of gas daily, will be owned by Continental and firms and individuals in Oklahoma.

It will manufacture propane, butane, natural gasoline products.

UPG expansion continues at fast rate

United Petroleum Gas Co., of Minneapolis, a wholly-owned subsidiary of Diversa, Inc., recently signed an exclusive five-year contract to market the entire LPG production of Steelman Gas, Ltd. (Domex, Saskatchewan).

Annual production of the Canadian plant is estimated at 12 million gals. Steelman will provide United with at least one-half of underground salt-dome storage capacity of approximately 12 million gals.

United also recently purchased marketing operations of Browning Gas Co., Plainview, Farmers L. P. Gas Co., Hillsboro, and Buzbee Gas Co., Spur, all of Texas; and Five Star Gas Co., Denmark, Wis.

At the same time, the company announced the installation of two new LPG bulk plants at Hickory Ridge and Mountain View, Arkansas.

Diversa, Inc., the parent company, reported revenues, net income and reinvestible cash earnings for the year ended Dec. 31, 1960. At \$482,500 for preferred dividends, 1960 net income was equal to 44 cents a common share vs. 3 cents a common share in 1959.

THE SALES SCENE

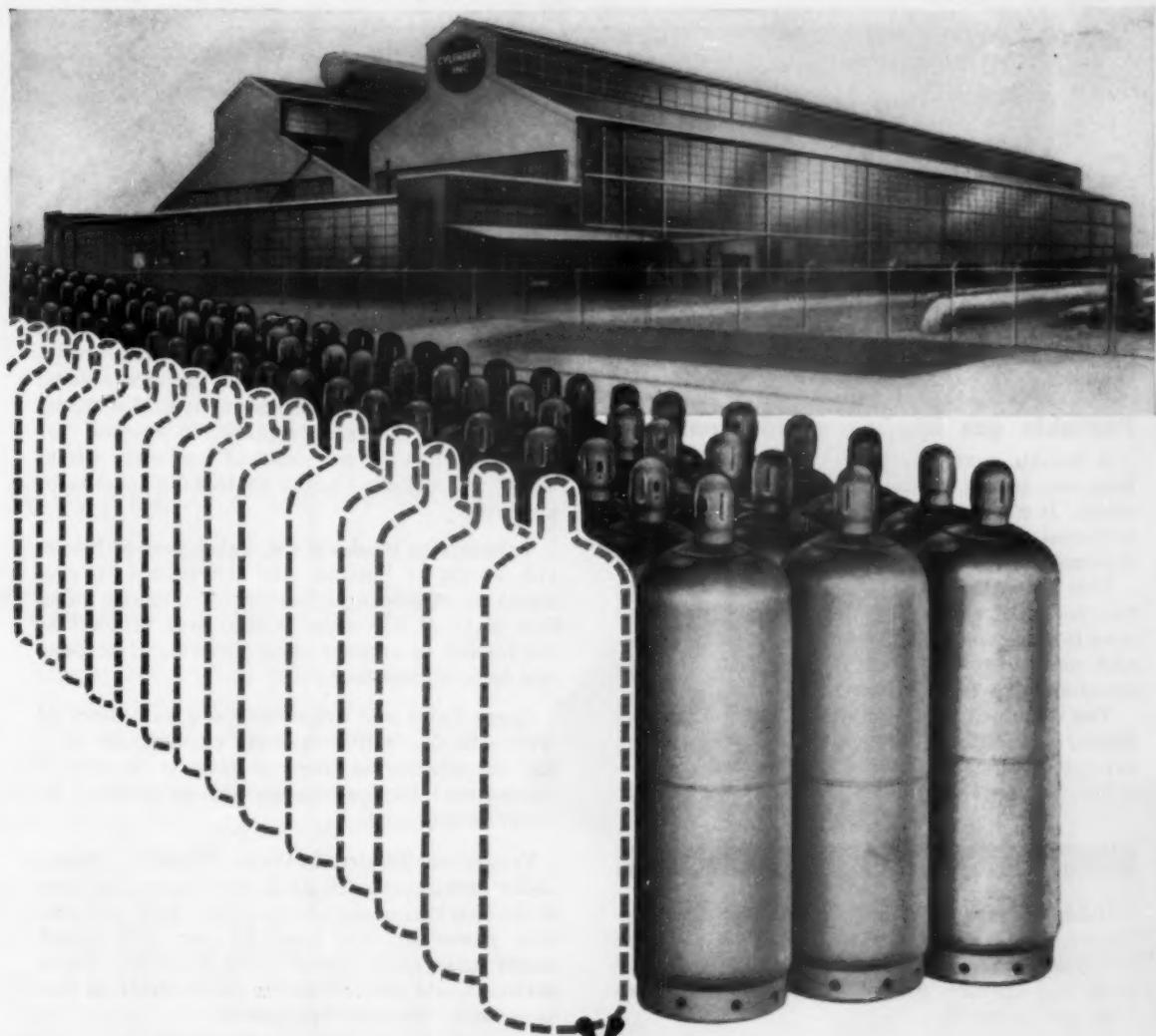
GAMA reports gain in appliances

Manufacturers of gas ranges shipped 19.8 per cent more units in March than in February, according to GAMA. Free-standing ranges accounted for an 18 per cent increase, built-ins a 28.4 per cent increase.

Residential gas central heating boilers and furnaces gained 0.7 per cent for the first three months this year as compared to the same period last year.

Factory shipments of gas-fired automatic storage water heaters jumped 20.7 per cent from February to March.

American Home Laundry Manufacturers' Association reports 25,618 gas dryers were sold in



An Uninterrupted Flow...plus A Brand New DEVELOPMENT in Cylinders

A steady, continuing stream of cylinders... in every dimension and capacity... each of the same high quality you formerly enjoyed from the Linde division... now yours from the new production lines of the fully modernized plant of CYLINDERS, INC.

And in addition

A brand new development — a new value that multiplies the life of *your* capital investment, the cylinder... available to you from the research and development laboratories of CYLINDERS, INC.

Cylinders, Inc. Successors to the propane and refrigerant cylinder manufacturing

business of *Linde* Company, Division of Union Carbide Corporation.



1200 WEST BLANCKE ST., LINDEN, N. J.

The industry in action

March, down 10 per cent from February, down 12 per cent from March 1960 and down 13 per cent for the quarter.

Portable gas appliances foreseen

A flexible connector which looks like a garden hose may be the answer to all portable gas appliances. It was described recently at the AGA Distribution and Production Conference by Forrest Hammaker of AGA's Labs.

This connector would perform the same function for portable appliances that rigid, metal pipe does for stationary gas appliances, such as ranges and refrigerators. It would be capable of withstanding high temperature.

The combined efforts of AGA Labs and Battelle Memorial Institute, Columbus, Ohio, produced an experimental connector which has been undergoing field tests for almost a year.

NEWSBRIEFS

Behm's Propane, Minot, N. D., recently purchased Devils Lake Bottlegas Co. of N. D. The new manager will be Jerry Behm. Behm's Propane now operates plants at Minot, Tioga, Westhope and Dunseith.

United Gas Improvement Co., an east-central Pa. utility, offered a unity plan to LPG dealers in its area. At meetings in Harrisburg and Allentown, May 15-16, UGI asked dealers to promote natural gas appliances. In return, the utility said it would, among other things, reimburse the dealers "for customers lost to new natural gas main extensions" via a sliding scale, up to \$125 for an all-gas home.

Tuloma Gas Products Co., subsidiary of Standard Oil Co. of Indiana, will distribute LPG produced by American Gilsonite Co.'s Grand Junction plant in Colorado. A unit will be built at the facility to produce about 325 bbls of propane and some butane daily.

Grove Valve and Regulator Co., a subsidiary of Walworth Co., will soon begin construction on a new manufacturing plant in Mexico. It will be located near Mexico City and will be operated by Grove de Mexico, S. A.

Transitron Electronic Corp., Wakefield, Mass., under agreement with AGA, has begun a project to develop thermoelectric modules which will provide power at less than \$1 per watt which would make them commercially practical. These devices would power blowers and controls on furnaces and other gas appliances.



CURRENT L.P. GAS & LR. GAS PRODUCTION & INVENTORIES

(A.P.I. figures—in thousands of gallons)

	Propane	Butane	Bu-Pro Mix	Iso-Butane	Other Mixes	Total LPG	Total LRG
Production (U.S.)							
April '61	407,346	204,178	54,292	70,427	83,300	819,543	270,997
April '60	362,849	198,955	55,023	55,884	67,781	739,492	270,018
'61 to date	5,668,224	2,895,831	855,873	942,045	1,174,151	11,529,124	4,291,931
'60 same period	5,197,964	2,799,899	892,414	868,416	1,021,595	10,809,198	3,844,229
Inventories (4-30-61)							
Zone A	6,983	505	18	...	10	7,516	23,606
Zone B	40,108	9,667	...	1,099	1,013	51,887	29,938
Zone C	83,687	27,706	515	5,143	...	117,051	14,023
Zone D	68,265	11,376	14,511	1,382	37	95,571	1,147
Zone E	162,054	154,992	1,945	45,219	13,712	377,922	70,198
Zone F	186,822	92,395	1,132	30,774	224	311,347	3,979
Zone G	5,014	748	9,355	15,117	966
Zone H	1,034	236	142	177	88	1,677	41,622
U.S.	553,967	297,625	27,618	83,794	15,084	978,088	185,479
U.S. (4-30-60)	320,863	240,782	18,669	46,392	4,072	630,778	101,304

TLC* dryer control is TIMER-less...and TROUBLE-less

Just set the dryness
and
FORGET THE TIMER

... because *there is no timer* in Robertshaw's TLC* dryer control system. And this means *there is no timer* to set, service, adjust or get out of whack!

TLC control means TIMER-less control . . . TROUBLE-less control . . . and tender, loving care for even the daintiest things. Yes . . . just set the dryness and forget the timer . . . Robertshaw's TLC dryer control does all the rest. Any size load, any fabric and any mix is dried exactly as desired . . . and even gently fan-cooled. No more under-drying . . . no more over-drying . . . and all the problems of timer-type dryer controls are eliminated.

Want more details? Write to Department B, Robertshaw Thermostat Division, Robertshaw-Fulton Controls Company, Youngwood, Pennsylvania. Canadian Affiliate: Robertshaw-Fulton Controls Company, Limited, Toronto.

VMA 8126



... the name that MEANS temperature control

*Trade Mark — Robertshaw TIMER-less control system for any dryer
(available on 1962 dryers)





Service plays a major part in his success!

Robert Morse knows how competitive the LP Gas business can get . . . that's why he speaks with pride of the long, successful history of his company, the Coleman Gas Service of Lockport, Illinois. He attributes a good part of this success to Cities Service. "To stay a step ahead of my competitors," says Morse, "I need fast dependable service. Our company has been getting this

from Cities Service for more than 25 years."

Like many leading LP Gas dealers, Morse has joined the Cities Service branded program. He displays the Cities Service emblem because he knows that the name stands for dependable quality and service. His customers know it, too. Go branded and see what the name Cities Service can do for you!

3435 Broadway
Kansas City 11, Missouri

20 N. Wacker Drive
Chicago 6, Illinois

701 Sherland Building
South Bend 1, Indiana

500 Robert Street
St. Paul 1, Minnesota

3101 Euclid Avenue
Cleveland 15, Ohio

7730 Carondelet Ave.
Clayton 5, Missouri

170 University Avenue
Toronto 1, Canada

1658 East Euclid
Des Moines 13, Iowa

626 E. Wisconsin Avenue
Milwaukee 2, Wisconsin



Beyond the Mains

By WILLIAM W. CLARK • Editor



The Twilight Zone

R. J. Munzer made an eloquent plea for industry unity in his farewell presidential address at the LPGA convention in Chicago last month.

It was the first time that the twilight zone that exists between the activities of the association and the LP Gas Council was acknowledged from a public podium. Said Munzer:

"One of the most noteworthy and consistent comments (expressed in a survey made by the LPGA Planning and Reorganization Committee) was the recognition of the need to unify the somewhat technical aspects of this association with the advertising and public relations functions of the LP Gas Council. It is quite evident that industry effectiveness is minimized, for example, if research and market development are independent of sales promotion. It is incongruous to have public relations separate from legislative action. . . .

"It seems unfortunate to me that a great convention of a great industry, such as we are having here at the present time, lacks a well-developed and experienced public relations arm. These functions, to name a few . . . must be coordinated."

As we read them, Munzer's remarks were in no way intended as criticism of the National Council's public relations work. An excellent job is being done by Chairman P. S. Harper and the staff. But, by the very nature of the Council, its PR activities are directed toward those areas that are *directly* related to sales. Council members chunk in their money for sales promotion, and the only purpose of the Council's public relations work, as now conceived, is to support, implement, and broaden the effectiveness of sales promotion.

As the organizations are presently constituted, the burden of public relations in the many other phases of the industry must be carried by the association itself. It is all too obvious that a real job is not being done. Unfortunately, the members themselves are not sufficiently aware of the contributions LPGA is making to the betterment of the industry. LPGA has not sold itself to the rank and file. The selfless sacrifices of time and money by its devoted committeemen has not been given proper recognition.

For too long, the association has depended upon its own house organ to carry its messages to the industry and upon occasional news releases to carry the industry's message to the public.

There comes a time in the development of a trade association when its most important responsibility is to advance the stature of the industry in the eyes of the public. This assignment embraces not only press relations and public relations, but research and promotion of the industry's image as well. That time has come.

Is "consolidation" or "coordination" of the activities of the Council and the association the answer? That question cannot be answered categorically. There are too many ramifying questions that must first be answered. Besides, who's to say what "consolidation" or "coordination" actually imply? Right now, the matter of getting together is obscured in a haze of semantics. It may well be that the best solution is to permit the two organizations to go their separate ways. But if such be the conclusion, one burning problem must be solved: somehow, in some manner, the twilight zone—the gap between the association's internal activities and the Council's promotional activities—must be breached.

As other associations have long since found out, the interpretation of an industry to the public is the No. 1 job. Time is running out. ■



GO MODERN

SELL MODERN



Let this NEW brand
help promote your
summer sales for . . .

- **FARM TRACTORS**
- **CROP DRYING**
- **TOBACCO CURING**
- **FLAME CULTIVATION**

CONTACT OUR NEAREST SALES OFFICE

WARREN PETROLEUM CORPORATION TULSA, OKLAHOMA

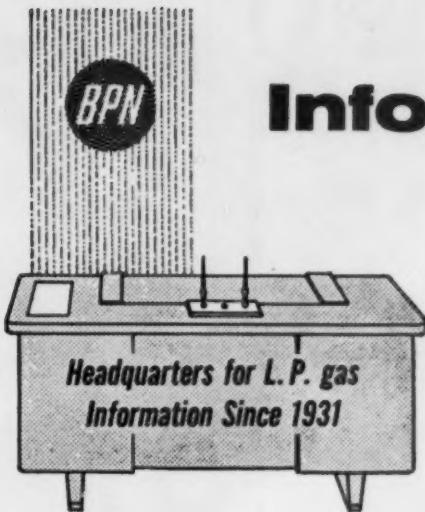
DISTRICT SALES OFFICES

COLUMBIA, S. C. • FT. WORTH, TEXAS • MIDLAND, TEXAS
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TAMPA, FLA. • MINNEAPOLIS, MINN.

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MONTGOMERY, ALA. • TOLEDO, OHIO • FOND DU LAC, WIS.
NASHVILLE, TENN. • SPICER, MINN. • GARDEN CITY, KANS.





Information Desk

Deodorizing LPG tanks . . . LPG as an auxiliary for diesels . . . Converting freon cylinders . . . Liquid level gauge for small tanks . . .

How do you clean out "smelly" cylinders?

Maine

In the past several months we have received numerous complaints from our customers about the smell of propane gas cylinders when the supply gets low.

We understand that the only way to remedy this is to clean the cylinders out. Would you please advise us as to the correct way to do this.

R. G.

We are sending you thermofax copies of two articles which appeared in earlier issues of BPN discussing the problem of removing the odor from cylinders and tanks. (Feb. 1954, "Deodorizing LPG tanks is easy with this method"; June 1955, "Solution to the problems of deodorizing old cylinders.")—Ed.



Propane can be used as an auxiliary fuel

Illinois

I would appreciate your assistance in locating sources of information on the use of propane as an auxiliary fuel for diesel engines. I believe considerable work on this matter has been carried on in the West Coast area.

W. F. S.

At present the company that has equipment to apply LPG to diesel engines as an auxiliary fuel is Ellis Manifold Corp., 3134 E. Washington Blvd., L. A. 23, Calif.—Ed.

Conversion of freon cylinders is clarified

Oklahoma

On page 23 of the March 1961 issue of BPN the conversion of Freon cylinders to LPG is discussed. The impression is left that ICC-4B225 cylinders are "legal and safe" for use with propane gas. Further qualifications should be added.

The "225" indicates the maximum service pressure (not working pressure) approved for this class of ICC-4B cylinders. Furthermore, both the ICC Regulations and NFPA Bulletin No. 58 carry a provision that a product shall not be placed in a container marked with a service pressure less than four-fifths of the maximum vapor pressure of product at 130° F. This provision may be found in paragraph 1.8 (a) of Pamphlet No. 58, and (in a more general form) in Section 73.304 (e) of the ICC Regulations.

NGAA specifications (page 5 of NGAA publication 2140-59) limit the vapor pressure of "commercial propane" to a maximum of 210 psig at 100° F. This is equivalent to slightly less than 300 psig at 130° F. This maximum vapor pressure material, therefore, would require an ICC-4B240 container, which has a service pressure four-fifths of 300.

The ICC-4B225 cylinders would be suitable for propane having a vapor pressure not exceeding 281.25 psig at 130° F, but would not be "legal" for all commercial propane meeting NGAA specifications. Their use would be confined to commercial propane in the lower

vapor pressure ranges of NGAA specifications.

E. W. EVANS

The editors of BPN wish to express their appreciation to E. W. Evans (technical representative of Phillips Petroleum Co.) for clarifying this matter for our readers.



Gauge indicates liquid level for small tanks

California

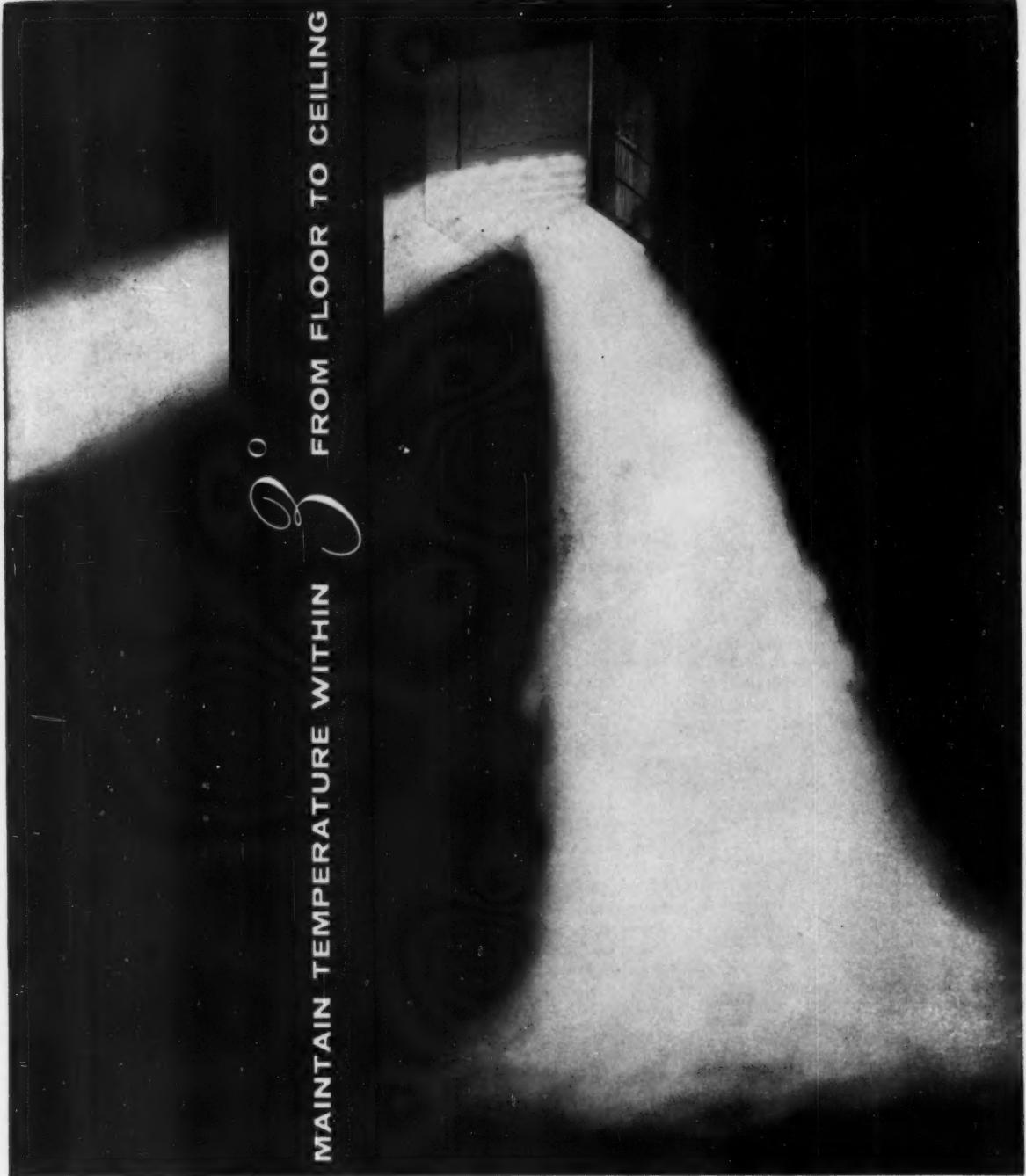
Do you know of any inexpensive gauge for LPG trailer tanks showing the liquid level?

R. P. C.

There is a small 4-in.-fixed level gauge that can be installed in place of the 1/4-in.-fixed level gauge normally used. It will indicate when the liquid level is below 1/4 full, between 1/4 and 1/2 full, between 1/2 and 3/4 full, and between 3/4 and the maximum full level.

If the cylinders you have are now provided with fixed maximum liquid level gauges, then the 4-in.-gauges can be installed to replace them. However, if the cylinders have only the one service valve, then the only way to determine the amount of liquid in the cylinder is by weighing the cylinder and deducting the tare weight.

The gauge mentioned above is called the Marsh Butane Gauge. Your equipment supplier should have them or knows where to get them.—Ed.



FROM FLOOR TO CEILING

MAINTAIN TEMPERATURE WITHIN

UNIT HEATERS

Arkla-Humphrey Multi-Directional unit heaters are accepting congratulations now. At long last, industry's toughest heating problems have been solved by the Multi-Directional!

Tests show a 15.38% fuel saving with only a 3° temperature differential from floor to 18' ceiling! Smoke photo above shows you why. The Multi-Directional is the first and only unit heater to discharge heat straight down, out in front, or from either side, or any combination of these three! Pulling the heat from the ceiling with top mounted fans eliminate over-heated ceilings, too.

Write for complete information.

ARKLA Humphrey

MANUFACTURED BY
GENERAL OFFICES

ARKLA

AIR CONDITIONING CORPORATION
SHANNON BUILDING LITTLE ROCK, ARKANSAS

IF

...we could prove to your satisfaction
that you could make more money
as an independent Skelgas LP-Gas dealer,
...would you be interested?



FILL OUT THIS COUPON AND MAIL TODAY -----

Mr. Don Barton
Skelgas Marketing, Skelly Oil Company
P. O. Box 436; Kansas City 41, Missouri

Dear Mr. Barton:

Without obligation, and in complete confidence, I would be interested in discussing the profit possibilities of an independent Skelgas Franchise with one of your managers. I am particularly interested in:

- How to gain operating cash from accounts receivable.
- How to double my income without additional capital investment.
- How to turn my bulk plant investment into an extra 150,000 gallons of gas business per year.
- How to make a \$2,000 investment produce like \$10,000.

NAME _____



COMPANY _____



CITY _____ STATE _____ Dependable Products

A TRUE
Counter-Flo
CONSOLE
WALL-HEATER



New Suburban Thru-Wall Heater — "Ventura"

NEW VENTURA THRU-WALL HEATER

Ideal for Home Remodeling!

- Most compact unit on the market
- A-19 Glascoat-sealed combustion chamber
- 20-year guarantee
- Installs flush or recessed (only 5" into room)
- One man can install from inside the house, quickly and accurately with fool-proof, exact-size installation templet
- Patented stamped-steel raised-port burner
- Dual heat exchanges provide bonus heat
- Easily accessible hand-level controls
- 100% safe—fully automatic
- Counter-Flo or gravity models

Displays and Sales Kits! Suburban supplies you with displays, literature, sales kits and other tested aids to help you get more business.

Send For Full-Line Catalog. You get a selling story and a selling price with Suburban gas appliances—more of what it takes to get more jobs. Mail the coupon today—get the whole Suburban story.

suburban

America's Finest Heating & Cooking Appliances

Samuel Stamping & Enameling Co., Dept. BPN
 Manufacturers Road, Chattanooga, Tennessee

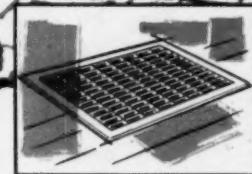
Please send full-line catalog and complete information.

NAME _____

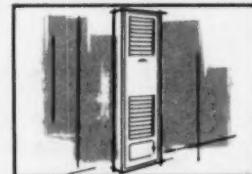
COMPANY _____

ADDRESS _____

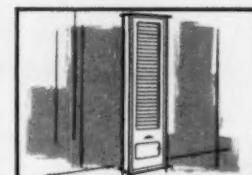
CITY _____ STATE _____



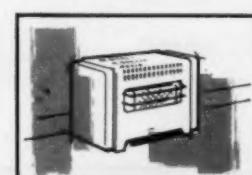
Floor Furnaces



Counter-Flo Wall Heaters



Gravity Wall Heaters



Space Heaters

*Great strides have been made since
BPN published this report a year ago*



Flame Cultivation— one year later

WILLIAM CLARK • Editor

RECAPPING ACCOMPLISHMENTS:

Cotton — technique proved, quality unaffected, strong indication of increased yield.

Grain sorghum—conventional technique proved, crop yield increased by avoidance of deep cultivation.

Corn—favorable field reports substantiated by research tests; technique proved.

Soybeans—flaming will bring good results when done after the plants are 10 in. high.

Onions—strong indications that flaming is safe and will eliminate blight.

Cabbages, table beets, carrots, bell peppers—although not considered proved, flaming shows great promise.

Caster beans—flaming virtually proved; eradication of disease is promising.

"WHEN WE HIT OUR PEAK NEXT YEAR, dealers in the High Plains area will be selling a million gallons of gas a day for flame cultivation."

That's the confident prediction of J. W. Gotcher, a man whose talk is big but whose actions are bigger. With hard work, money, persuasiveness, and a keen sales promotion sense, he has helped to push flame cultivation from dormancy to buzzing activity within a space of two years.

The High Plains area is a group of 24 or 25 counties in West Texas, up near the Panhandle. It is here that the awakening of flame cultivation has taken place.

The center of activity has been the High Plains Research Foundation at Halfway, Texas, a few miles west of Plainview. With a research program at the Foundation as a co-ordinating force, the development of this multi-faceted load spread quickly through the immediate area, and has begun to fan out throughout the nation.

The story of how the program got started was told in *BUTANE-PROPANE News* last July (pages 29-34). In brief, the article related how an emergency at the Foundation threatened the cotton crop; how Bill Taylor, manager of Gene Bumpus Butane in Plainview, had brought together Gotcher, the equipment manufacturer, and Dr. Tom Longnecker, director of the Foundation; and how, after the Foundation had witnessed the results of flaming, an informal program had been started. It also reported on the first year's experiments, which had then been completed.

This, however, was still only a start. The past 12 months have been even more dramatic advances in the art, as well as in the promotion of this highly important off-season load.

Those first year's experiments did not cover a complete crop year. Nor had the research been formally "programmed," so there was no research fund specifically al-

Flame Cultivation

located to it. Money had been provided in the form of grants from Bill Taylor, Warren Petroleum Corp., Shamrock Oil Co., and Dorchester Corp. Gotcher had contributed his time. As news reached important ears in the producing "community," other help came—notably from Cities Service, Union Texas, and Tuloma.

Recognizing the significance of having a highly respected, independent research organization behind the work, the producers began intensive programs of indoctrination for their own personnel. Field trips to High Plains were organized; there producers' representatives were able to see for themselves what was being—and could be—done. The companies themselves began to put together the promotional machinery needed to promote the load.

At the same time, the activity was earning the wholehearted support of the men who supported the Foundation with their contributions—the farmers themselves. For 1960, they voted the necessary appropriations to make flaming research a formal program.

At the end of that first year, Dr. Longnecker was willing to state that weed control in cotton, grain sorghum, and soy beans showed favorable "possibilities." But he was not ready to give unqualified endorsement without further study.

That, in brief, is where matters stood in the late spring of 1960. Flame cultivation appeared to be on the threshold.

Then the power of communications began to be felt. The producers carried the word to the leading marketers by word of mouth. The article in BPN informed thousands of others. The National LP-GAS council put on a field day for the press at High Plains, and as a result many thousands of farmers began to learn about this important new way to produce better crops for less money.

At about the same time, supplementary research was starting in the Rio Grande Valley, which has different crops and different crop seasons. The Texas Butane Dealers Association, which had begun to

swing its support behind the work, sponsored a field day there for its members.

With all these forces at work, flame cultivation suddenly began to enjoy the attention it deserves. Dealers from all over the nation clamored for equipment and instruction.

"The roof fell in on me," Gotcher complains with a sly chuckle. "Ever since the word got out, I've been working seven days a week. I wore out one car and now have 35,000 miles on another. I've had to ration my equipment."

"Everybody wants to sell flame cultivation."

"Everybody" includes some of the biggest marketers in the industry—National Propane, Petrolane, Dri-Gas, Thermogas, to name only a few.

Furthermore, many state associations have put flame cultivation discussions on their programs in the past 12 months. Gotcher, his son, Bill Charton of AFCO, and others who know the products and the techniques have appeared at state conventions. Dr. Longnecker has been in demand as a speaker before consumer groups.

At this point, Gotcher has a tiger by the tail. His files contain letters from dealers in practically every state in the nation, all asking the same thing: "When can we get started?" He's trying hard to keep the program under control, building a nationwide sales-and-service organization with one hand while holding tight to Dr. Longnecker and the research program with the other. Despite all the hubbub, much research still remains to be done. The Foundation won't be satisfied until it has obtained all the information and substantiation it feels it can possibly get.

For example: Cotton has been flamed for two seasons with a great deal of success. During the first year, the study concentrated on determining the effects upon the weeds. During the second year, emphasis shifted to the plants themselves. Now, in the third year, High Plains wants to test destruction. It wants the answer to the question: How far can we go before we destroy the plant itself? Conversely, it also wants to find out

how far it can go in reducing the amount of flaming done without destroying its effectiveness.

In other words, it is seeking to establish upper and lower limits.

At this point, it seems pertinent to ask:

What has research established in the various crops and weeds under test?

What remains to be done in the near future?

Let's review progress in the various crops, one by one:

First, cotton. In 1960, tests were made with different tractor speeds and pressure settings, with cross and parallel flaming, pre-emergence flaming, with "midget" burners, and with initial flaming being done at various stages of plant growth. All cotton was flamed five times.

Pre-emergence flaming was done just as the cotton plants were beginning to break through. From 2 to 3 per cent of the cotton was visible above ground. Cotton seedlings that had emerged were killed or damaged, but there was no "apparent" damage to those still below the surface. Careless weeds and crabgrass seedlings were killed almost completely.

In this pass, the heat was applied in both cross and parallel burner settings. No difference in weed kill could be detected between the two. No actual weed count was made, but the only weed left to hoe was purple nightshade, which is unaffected by flaming. Pre-emergence flaming reduced hand hoeing to about one hour per acre.

Midget burners were used twice, the first time when the cotton reached a height of 4 inches. Standard burners were used after the cotton reached a height of 9 to 10 inches. The midgets are smaller than the standard and operate at 700 to 900 deg. instead of the standard's 2000 to 2100 deg. Obviously, they can be used on younger and more tender plants, but do not have the weed killing power of the larger burners. Since they have a smaller flame pattern, four were used per row to cover an area 12 to 14 inches wide.

Quality and quantity of the crops were tested—by independent research agencies—against unflamed

check plots. Quality determinations on both the unflamed and flamed cotton were so similar that, the Foundation reports, "it is indicated very strongly that flaming to control weeds had no effect on cotton quality."

Quantity varied from plot to plot, with the flamed plots averaging slightly higher yield than the unflamed. But where the midget burners were used early and the standard burners later, the cotton yielded 102 pounds more than the check plot crop. While Dr. Longnecker refuses to accept this evidence as conclusive, he does make this statement:

"This . . . would be a strong indication that this flaming technique actually increased yield. It has been reported from other areas that flaming can provide a considerable degree of insect control. Because of the cool, wet weather during the early stages of cotton growth, thrips and fleahoppers were very difficult to control; it is believed that the use of midget burners on the 4-in. cotton may have killed enough of these insects so that the cotton was able to get off to a better start. This could account for the increased yield."

As for the weeds themselves:

"Careless weeds, goatheads, seedling Johnson grass, purslane, and annual grasses, such as crabgrass, up to a height of 4 in. were successfully killed with flame. Under certain conditions, it may be possible to kill larger weeds; but more heat will be required and this will increase the possibilities of damaging the cotton.

"Purple nightshade, blue weed, and horse nettle were not controlled by flaming. Johnson grass from rootstalks was set back by flaming but not killed."

Grain sorghum. Two methods were used in these tests. In the first method, the "usual" weed control practices were followed until the crop was 12 to 14 in. high. In this method, no plants were killed but yield was substantially increased.

Why the increase? "Better weed control could account for a part of (it), but it is believed that conventional cultivation (in the check

plot) reduced yield. *Deep cultivation, to throw dirt to the crop and cover weeds in the row, damaged the root system, resulting in reduced yields.*"

The second method was used when wet weather at planting time brought both weeds and grain sorghum up together, making the usual methods of weed controls ineffectual. The crop was flamed when it was from 1 to 4 in. high and the weeds less than 2 in. high.

This latter method was tried twice. The first time was on a neighboring farm where the crop had been planted May 12. Weeds present included, primarily, crabgrass and careless weed, plus a few horse nettle.

Only the horse nettle and the crop itself resisted the flame. The grain sorghum leaves turned a light brown but the lower part of the stem remained green. Within four days they had started new growth but were about 4 to 5 in. shorter than the adjacent unflamed sorghum. As the crops matured, they caught up; when harvested, they appeared to be the same height.

Yield was greater in the flamed plot than in the unflamed, but not enough greater to warrant any conclusions as to the effect of flaming.

This field was flamed only once.

The method was tried the second time at the Foundation. In order to determine the effects of repeated flaming on small grain sorghum, flaming was done first when the plants were from 3 to 4 in. tall, then repeated at 5-day intervals up to a total of five flamings. Three additional flamings were done after the crop had reached a height of 12 in.

Both plant population and yield were decreased sharply. Dr. Longnecker believes this is due in part to the fact that the crop had not been planted until June 26, more than a month after the neighboring farm's crop had been planted. Accordingly, he "suggests" the use of this technique only for early plantings, and then, of course, only when weeds and grain sorghum come up together. He reasons that, since the crop was planted after June 1, "flaming off could reduce yields by delaying maturity so that frost

caught the plants before they were mature.

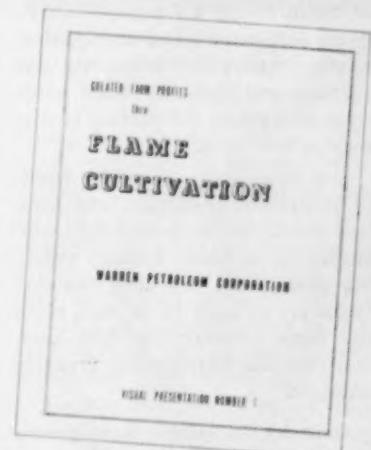
"Until more information is obtained," he says, "this practice is not recommended except on a trial basis."

Corn. The Foundation's test was undertaken merely to verify reports of successful weed control with no reduction in yield, which were based upon years of actual experience in the Mississippi delta.

Flaming was started when the corn was 12 to 15 in. high. It was flamed four times, the last time when it was so tall it would barely clear the tractor axles. The corn had been cultivated once, with some dirt being thrown to the plants; but the soil had not been disturbed again.

The corn remained almost completely weed-free throughout the growing season without hand hoeing. Says Dr. Longnecker, "Yields were 130 and 131 bushels per acre respectively from the flamed and unflamed areas, indicating that the use of the flame did not reduce the yield."

Soybeans. A test was conducted to see if flame cultivation would have any effect on yields. The problem encountered was this: Soy-



So impressed is Warren Petroleum Corp. with the possibilities of flame cultivation that it has developed a complete slide presentation, with script, shown above. It covers the advantages of flame cultivation, along with the theory, burner setting practices, field experiences, and results. Warren is making it available for presentation to farmers, county agents, 4-H clubs, and other interested groups.

beans fruit very close to the ground. Could flaming damage fruit that set on the lower 3 or 4 in. of the stem and thus reduce yields?

The weed crop included careless weeds, crabgrass, goatheads, and purple nightshade. It had already been established that the flame would control all of these except the purple nightshade.

The soybeans were cultivated once with a rotary hoe and once with a regular cultivator. This made water furrows and threw some dirt to the plants so they would be on a raised bed about 2 or 3 in. high. A few large careless weeds which came up with them were hand-hoed.

The flame cultivator was used twice, first when the plants were 12 in. high and again just as the blooms began to appear.

Goatheads and careless weeds were all less than 3 in. high at the time of the first flaming; all were easily killed. Light rains in August and early September brought up a few more of both species, but much less than were in evidence before the first flaming. These, too, were eliminated, and for the remainder of the growing season the flamed areas were almost completely free of them. Says Longnecker: "The flame cultivator killed the seedling weeds without disturbing the soil surface and thus no weed seeds were brought to the surface to produce a new crop."

His conclusion: "Seedling weeds of goatheads, crabgrass, and careless weeds can be successfully controlled in soybeans without reducing seed yields, providing the soybeans are at least 10 in. high when the flame cultivator is first used, and that the burners are properly adjusted."

Onions. No onions were grown at High Plains Research Foundation in 1960, but flaming experiments were carried on at five farms in the area. These locations provided an excellent variety of environmental conditions. Soil, irrigation practices, and other farming techniques varied markedly one from another.

The tests were conducted with

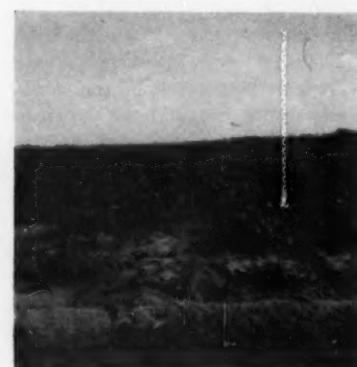
both seeded onions and transplanted onions. In a part of one field, seeded onions and weeds came up together. There was almost a "solid" stand of annual weeds, primarily careless weeds.

A hand burner was used on a small plot when the onion plants had reached a height of 2 to 4 in. and the weeds were at a maximum of 2 in. Enough heat was applied



BEFORE . . .

Here's how a bindweed-infested crop looked just before the first flaming. At this time, the cotton was about 3 to 4 in. high. Then a pass was made with a flame cultivator. To see the results, follow the sequence on the following page.



AFTER . . .

This is how the crop looked after several flammings. The crop is now so well developed that it can shade out new weed growth.

to kill the above ground portions of both.

A count of the onion plants had been made; not a single one was lost. Within 5 days all had recovered and were growing. The weeds did not come back.

Encouraged with these results, the researchers used a 4-row flame

cultivator on a much larger area. Because the soil was very dry, neither onions nor weeds had grown perceptibly in the meantime. The entire top of the bed was cleared of vegetation. The weeds did not come back; the onions did, within three to five days.

Says the Foundation's report: "Periodic checks during the summer showed the flamed onions were slightly smaller. At harvest time it was estimated that they were approximately five days later than the unflamed."

"Stand counts indicated no effect on stand due to flaming."

In conclusion, the Foundation cautions that "data and experience are too meager to use as a basis for any conclusions."

With transplanted onions, four farms were put under study. Various burner settings were used. The flaming was done from two to three weeks after transplant, giving the onions time to recover from the shock of transplanting and become well established.

Says the report: "The immediate effect of flaming on the appearance was to change the color of the plants from a bright to a dull green. Within three or four days the normal color would return; the only evidence of flaming would be the brown tips, measuring from $\frac{1}{4}$ to $\frac{1}{2}$ in.

"Maturity was not delayed in any flamed field. The flamed onions were ready for harvest at the same time as the unflamed. Onion grade and quality were the same.

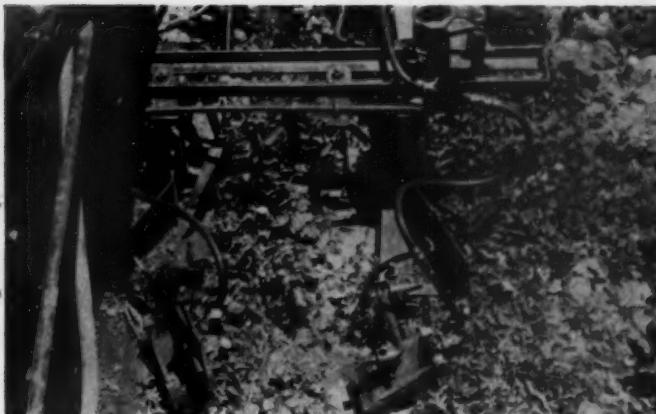
"Complete weed control was achieved in three of the four fields where the flame cultivator was used. The fourth field was hand-hoed once."

Says Gotcher, simply: "You can't hurt onions."

According to Gotcher, additional work was done on onions in the Rio Grande Valley this past spring. There they were hit by a blight, which can quickly kill them. There was no known cure for the disease, so they were flamed.

The plants were cut off with a shredder just above the surface of the ground. Then the heat was poured directly down onto them. They recovered quickly from the

HOW FLAMING CHECKED THE GROWTH OF BINDWEED



Midget burners were used on this first pass, which was made close to the row itself. The middles were left untouched.



This closeup of the weed before flame cultivation is applied, shows its sturdy growth and spreading tendencies.



The same weed, 24 hours after flaming, has withered right down to the surface of the soil, and into the first node below ground.



Thirty days later, after flaming the weed to the surface of the soil, it has come back again and started to spread.

flaming, and were blight-free.

Other crops. Work has progressed in the Rio Grande Valley on control of weeds in cabbages, table beets, carrots, and bell peppers. This was started about the first of December and was expected to be completed about last April 15. As the work was nearing the windup, Gotcher reported that it looked promising.

"We used the regular burners for these crops," says Gotcher. "On beets, we directed the heat right on the plants when they were about 2 in. high. This killed the weeds, but the tops of the plants came back quickly."

With cabbages, the burners were set parallel to the row, so that the cool edge of the flame (about 1000

deg. F.) was directed in under the cabbage plant. The flaming was done when the plants were about 5 in. high. Gotcher says the results were "excellent."

Carrots were flamed when the tops had reached a minimum of 4 in. in height. They were destroyed back to the surface but, says Gotcher, they came right back.

Bell pepper flaming also appeared promising.

(These latter appraisals, it should be noted, are Gotcher's and not the Foundation's. No reports have been issued as yet on any of these crops. Gotcher says that this work will be carried on at High Plains itself this summer.)

The Foundation has also carried on some other interesting studies, including potato flaming. A report

issued last October states, "The flame cultivation of potatoes (conducted last summer) must be considered a pilot study, and the data and information cannot be used as a basis for recommendations, but they do indicate some interesting possibilities." Research was to have been carried on at Rio Grande Valley and High Plains this year.

Another test, conducted last fall, was on field drying of grain sorghum. The object of this work was to determine if the field application of heat would speed up the drying process and, if so, whether the method would be practical.

When the plants reached maturity, with the moisture content at 35 per cent or less, heat was applied with a flame cultivator mounted on a high-clearance trac-

tor. The flame and heat rose up the plant, with the lower leaves usually catching fire and creating additional heat.

With favorable weather, it was found that the flaming doubled the rate of drying, permitting harvesting from 10 to 14 days early. Said the Foundation's report: "Combine operators have pointed out that in pre-frost harvesting of grain sorghum, with green leaves on the plant, these leaves add moisture to the grain. They . . . cannot be shredded and blown out by the combine and, as a result, they carry grain on through which is lost. The combine operators have estimated that 200 to 500 lb. per acre of grain might be saved by killing the leaves before harvest."

The Foundation did not consider the results of its tests "conclusive," but did feel they were encouraging enough to justify continuing the study next fall.

Bindweed. While the Foundation sponsored no research on this vicious weed, a farmer in the area, working with Gotcher, did run some tests. The results are also characterized as "encouraging."

In this field, only four crops had been planted in a period of 21 years, and none had been harvested because in each case the weed, aptly known by another name—"possession vine," had completely smothered them. The only way in which the weed had been controlled in the past was through soil sterilization. This cut down the frequency of crop plantings and, obviously, was of little value.

When the flame was applied, it readily killed the foliage above the ground as well as the stem below the ground line down to the first node. No new growth was evident until about 14 days later. (With hand hoeing, it comes back in three or four days.) Gotcher found that this growth could be controlled with two or three additional flammings; by that time, the crop shaded it out and it was no longer a problem.

"If no portion of the plant is exposed above the soil, it appears that the root system itself will have no effect upon the cultivated crop," says Gotcher.

Control can be most effective in

crops that will tolerate flame during the early stages of growth, such as corn or grain sorghum. It is much more difficult to control the pest in cotton and soy beans.

Research will be continued in the current year even though Gotcher is already satisfied that flaming will control bindweed. "But we have also had indications that the flame actually could destroy some of the roots. To me, this is evidence that it might be eradicated completely."

Castor beans. Longnecker terms the studies on eradicating weeds in castor beans "one of the most encouraging" of all those conducted in 1960.

This study came about by accident; actually the Foundation was trying to eradicate the castor beans themselves. Since the beans are poisonous, volunteers that appear in feed crops must be removed. But when flame was applied, the castor beans refused to die. "Even though all the leaves were turned brown, new growth could be observed within four or five days after flaming," says Longnecker.

When it was decided that a study should be made to eradicate weeds in castor bean crops, a number of flaming methods were tried. Comparable yields were obtained with all of them, and all yields were in turn comparable to that obtained in a hand-hoed test plot.

This year, the Foundation is going to run tests to establish the effectiveness of flaming in preventing a disease known as alternaria leaf spot. During the time the 1960 experiments were being carried on, this disease struck a number of fields, reducing yields to 1100-1500 lb per acre. The flamed fields averaged more than 2000 lb. However, an adjacent unflamed plot also was free of the disease and had yields comparable to those of the test plots.

Longnecker believes that the disease may have been brought on by conventional cultivation practices, which might have damaged the root system and weakened the plant. No cultivator was used on either the flamed or unflamed plots at High Plains.

The castor bean research has broad significance. Until recently, only a small percentage of the prod-

uct consumed in the United States (its chief uses are as raw material for plastics, jet engine oil, paints, varnishes, and other finished products) were grown here.

Now, farmers are beginning to recognize its worth. The crop has been grown in the High Plains for several years; today, it is being planted in south central Nebraska and in Kansas as well. There is a real push developing in these areas. The Baker Castor Oil Co. of Bayonne, N. J., is behind it, as is the University of Nebraska.

Chemicals will not control weeds in castor beans, according to Dr. David Kittock, University of Nebraska agronomist. In fact, he says, some chemicals will kill the castor beans as readily as they will the weeds.

To learn more about castor bean culture, officers of the South Central Nebraska Industrial and Agricultural Corp. have made several trips to High Plains. While there, they have also learned about the Foundation's work in flaming.

According to Gotcher, there were two principal reasons why castor beans were not a favorite crop in the United States. First, no good harvesting equipment has been available until recently; and second, they were not a good enough "dollar" crop to pay for the expense of weeding them. Furthermore, there is virtually no hand labor in Kansas and Nebraska, he says.

Now he anticipates a rush to grow this crop. "Kansas will be one of my best markets," he says.

Speaking of markets, when (and if) High Plains reaches that 1 million a day mark in 1962, one of the busiest suppliers of fuel will be Gene Bumpus Butane. "Last year, Bill had about two dozen flame cultivators," says Gotcher. "But in the first three months of this year he received shipments totaling more than 100 units, and by the time the season is in full swing he should have 300 working."

It appears that Bill Taylor's gamble is just about to pay off. ■

A reprint of this article can be obtained by writing on company letterhead to the Editor, BUTANE-PROPANE News, 198 S. Alvarado St., Los Angeles 57, Cal.

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accurately measures cooking heat... maintains pre-set temperatures automatically

You have a mighty "smart" sales assistant when the ranges you sell are equipped with the famous UNI-MATIC® Flame Selector. Engineered by Harper-Wyman, this is the Burner-with-a-brain* that offers your customer the same accurate heat controls *on top of the range* that she's accustomed to in her oven.

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Lesson Plan Guide



Here is a lesson you can use to educate your employees on how to meet the electrical competition . . .

LET'S SUPPOSE YOU HAVE A SEVERE ELECTRIC COMPETITION PROBLEM . . .

Are you meeting it successfully? If not, is it because the L.P. gas story is not being put across?

Whose fault is that? It may be that *you* (the manager) know it very well; but do your contact employees—your drivers, in particular—know it well enough to present it to the customer *in the face of strong pro-electric propaganda*?

Here is the weak link in our fight, according to William J. Moore, general manager of the Placer Gas Cos. in northern California. He says: "The people who are in the best position to tell our side of the story do not know it, or do not understand it."

Our first job, then, is education.

Moore is an ex-schoolteacher, so

This is a staff-written adaptation of a presentation made by Mr. Moore before the Western Liquid Gas Assn. at its annual convention in Sacramento, Calif., April 15.

he is well qualified to voice that opinion. In his own company, he has been doing a thorough job of employee education, and the results reflect it.

Being trained to teach, Moore recognizes that a simple presentation of the facts is not enough. You must follow a teaching format to get the story across. Then you must

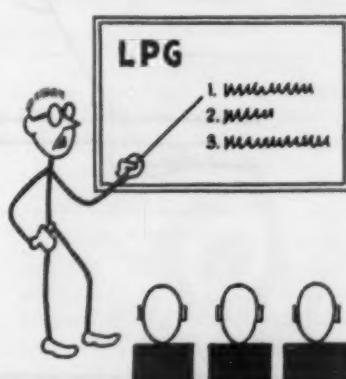
repeat the training at frequent intervals—perhaps once a month for a while, until your employees have absorbed it thoroughly. Then, to refresh their memories, you must reiterate it at less frequent intervals—perhaps once or twice a year.

By following a format similar to the one he has laid out, employers everywhere can present the story more effectively to their personnel. In outline form, his "Lesson Plan Guide" is as follows:

1. What
2. Why
3. How
 - a. Motivation
 - b. Body
 - c. Summary

Now let's see how Moore develops the "lesson" from this simple outline.

1. What. This is simply a statement of what you are intending to



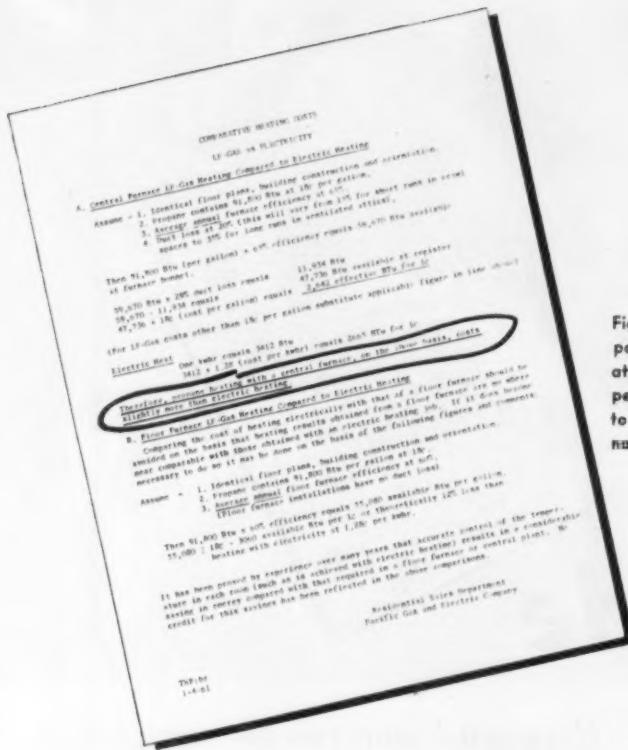


Fig. 1. This comparative analysis attributes only 65 per cent efficiency to the LPG furnace.

Fig. 1 is a typical bit of PG&E propaganda. It purports to show "Comparative Heating Costs, L.P. Gas vs. Electricity," but it is open to attack. In the first place, it accords the LPG furnace only 65 per cent efficiency. The requirement is for 70, minimum, and many furnaces exceed that figure.

The conclusion, when comparing central furnace LPG heating with electric heating, is shown at the center of the page: "Therefore, propane heating with a central furnace, on the above basis, costs slightly more than electric heating."

At this point, Moore directs his "class" to discuss the propaganda and find its weak points. Here are a few that can be easily spotted:

- Unlike the gas industry, which would usually rather err on the side of conservatism as regards the efficiency of its equipment, PG&E claims 100 per cent efficiency for its own fuel but knocks gas down to the level of poorly operating equipment.

- It uses as its own rate 1.28 cents per kwh. This is the "tail block" in its rate structure—the lowest rate, achievable only after you've already used 200 kwh. This is not the average rate paid, as Moore proves by displaying Fig. 2, PG&E's bill insert for the month of December, 1960. He points out to his class that the "average

Lesson Plan Guide

accomplish, i.e., "How to meet the electric propaganda."

2. Why. There need to be reasons why we should do this. The reasons are basic, and rather obvious, but if you are going to get your story across you must return to fundamentals. They are:

- The propaganda being disseminated by the electric industry is extremely harmful to our industry. Remember: the electric industry, not the neighborhood propane dealer, is our real competitor.

- By studying the electric propaganda, we can better understand our competitor and his product.

- Once in possession of the electric industry's flimsy, distorted story, we will want to tell the public the truth about our product vs. electricity.

3. How?

a. Motivation. To make a person learn, you must stimulate in him a strong desire to learn. You can show him electric propaganda that will stir him up—make him wonder—perhaps make him a little angry.

Moore does this by distributing some of the competition's propaganda and showing where it is in-

accurate or unreliable. The competition in this case is Pacific Gas & Electric Co., which is strongly pro-electric in most of the areas it serves and has been the toughest kind of competition for Moore and other LPG dealers in northern and central California.

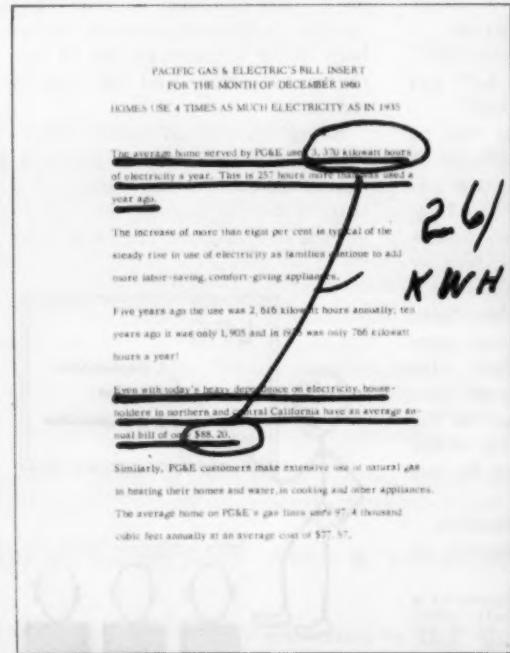


Fig. 2. PG&E states 1.28 cents per kwh as its own rate. This bill insert shows a usage of 3370 kwh, costing \$88.20, and this comes to 2.6 cents per kwh.

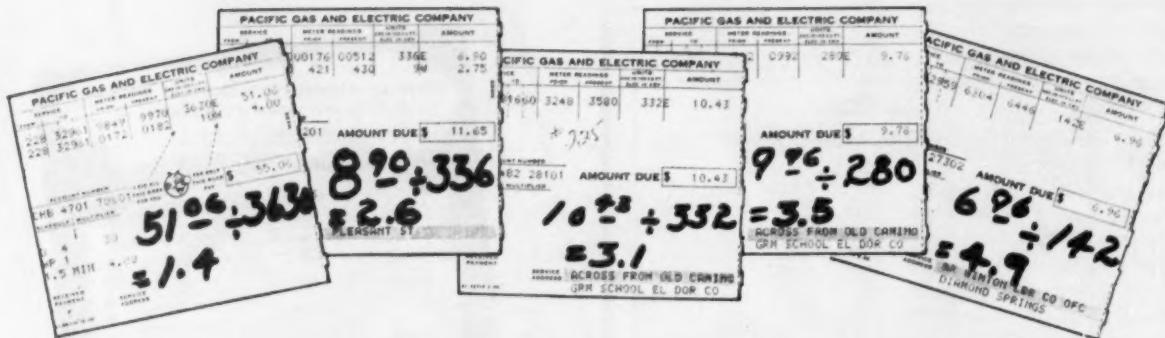


Fig. 5. These bills show (bold lettering) the average paid per kwh, computed by dividing the total bill by the meter reading. In his formulas, Moore uses 2 cents as the average figure.

Lesson Plan Guide

lettering the average paid per kwh, computed by dividing the total bill by the meter reading.

There is variance (Fig. 5). Some average less than 2 cents, many are between 2 and 3 cents, others are 3 or even 4-plus.

After discussing the problem with his students, he obtains agreement that 2 cents is a reasonable, conservative average figure to use.

So now he has this basic formula, derived from the last one:

$$\begin{aligned} 23 \text{ cents (propane)} &= \\ 54 \text{ cents (electricity)} & \end{aligned}$$

"In other words," he concludes, "LPG in the Auburn area is 57.4 per cent cheaper than electricity."

At this point, he reminds his students, we are still dealing in abstractions. Let's get the probable costs of gas vs. electricity for a typical family of four—man, wife, and two children. And let's see what their hot water should cost them each month, with gas and with electricity.

How much do they use? Moore refers to a study (Fig. 4) published by N. H. Stark Corp. in 1960, titled "Here are comparative facts and figures to help you make a selection" (as to fuel for heating water). He distributes it to his class.

Here is how average monthly usage of hot water is computed:

A reprint of this article can be obtained by writing on company letterhead to the Editor, BUTANE-PROPANE News, 198 S. Alvarado St., Los Angeles 57, Cal.

1. Dishwashing (by hand)
3 meals/day \times 30
days \times 3 or 7 gals) = 270 gals
2. Personal toilet use
(4 persons \times 30 days \times
2 gals) = 240 gals
3. Bathing
a. Shower
(2 persons \times 30 \times
15 gals) = 900 gals
4. Washing clothes
Automatic washing
machine
(30 days \times
20 1/2 gals) = 615 gals

Total 2925 gals

"Let's assume," says Moore, "that the withdrawal of 140 deg F water is diluted with 60 deg F cold water to obtain the normally used 100 deg F water. This being the case, our 'average family' will heat approximately 1500 gals of water per month.

"What will it cost to heat this water by means of LPG at .184 per gal and electricity at 2 cents per kwh?

"We all know that a gallon of water weighs approximately 8 1/3 lb. Now if we convert gallons into pounds ($1500 \times 8\frac{1}{3}$), we come up with a usage figure of 12,500.

"We also know that it takes 1 Btu to raise 1 lb of water 1 deg F.

"Now, we want to raise the 12,500 lb of water from 60 deg. to 140 deg (the thermostat setting), a difference of 80 deg. So we multiply 12,500 lb by 80 deg. The answer is 1 million Btu; that is the amount of energy needed to raise the temperature of 1500 gal of water.

"Let's see how much those 1 million Btu will cost using LPG. Don't forget to add on that 20 per cent stack loss. To get 1 million usable

Btu, we'll have to burn 1,250,000 Btu. That is, 20 per cent of 1,250,000 is 250,000; subtract it and you have 1 million.

"Remember 1 gal of propane equals 91,800 Btu

$$1,250,000 \text{ Btu} \div 91,800 \text{ Btu}$$

$$\text{equals } 13.7 \text{ gals}$$

$$13.7 \text{ gals} \times .184 \text{ cents equals}$$

$$\$2.70$$

"Now, compute the cost using electricity:

$$3412 \text{ Btu equals } 1 \text{ kwh}$$

$$1,000,000 \text{ Btu} \div 3412 \text{ Btu}$$

$$\text{equals } 293 \text{ kwh}$$

$$293 \text{ kwh} \times .02 \text{ equals } \$5.86$$

Briefly stated, it will take \$5.86 worth of electric energy to heat the 1500 gals of water while it takes only \$2.70 to do the same job with LPG. Of course, this conclusion is based on the following assumptions:

"Propane costs .184 per gal

"The propane water heater
operates at 80 per cent
efficiency.

"Electric current costs 2
cents per kwh.

"This same approach can be used in drawing cost comparisons between gas and electricity in other uses."

This concludes the "body" of the "how" of Moore's presentation. He winds it up with a quick summation of the facts.

The program is simple and straightforward. Moore has tried it and found it effective. It may be the answer to teaching your employees the gas-vs.-electricity story; and it may be the medium through which they can communicate this all-important story to their "contacts," your customers and prospects. ■

Pamphlet 58 celebrates 21st birthday with most extensive revisions

Shortly before this issue of BPN is to come off the press, NFPA will hold its 65th annual meeting at the Statler Hilton in Detroit and —among other things—will probably approve the 14th revision of Pamphlet 58.

ROBERT CLAY • Managing Editor

THE 14TH REVISION OF PAMPHLET 58 IS PROBABLY THE MOST EXTENSIVE EVER. As approved by the NFPA Committee on Gases, it involves some 36 pages of revision.

Many of these changes are in wording and arrangement, either to clarify or further define the meaning, or to make the code easier to use. This article summarizes the significant changes on a division by division basis:

Introduction

The application of Rules section is extensively rearranged, primarily to make it easier to use. Part of this material is now in a separate Definitions section.

The remaining material is divided into two sections, one telling what the standard covers; the other, what it does not cover.

The standard does not apply to LPG refrigerated storage systems, nor to low pressure systems (less than $\frac{1}{2}$ psi or 14 in. wc) and the installation of commercial and residential appliances supplied through such systems. The reader is referred to Pamphlet 54.

New material appearing under Definitions includes definitions of "vaporizer-burner" and "Movable fuel storage tenders or farm carts."

Basic rules

Section B. 3. Requirement for

Construction and Original Test of Containers now has a footnote (at the end of paragraph "a"), stating that construction of containers under the API-ASME Code is not authorized after July 1, 1961.

The references to nodular iron in B.7, Container Valves and Container Accessories, paragraph (a) and B.8 (Piping, Tubing, and Fittings), paragraph (f), change the ASTM specifications from A339-51 T to A395-56 T.

Section B. 8 is revised extensively. Paragraph (a) now allows the use of aluminum pipe. Subparagraph 1 states that vapor piping and tubing with operating pressures under 125 psig should be suitable for a working pressure of at least 125 psig and should be at least Schedule 40. Subparagraph 2 specifies that vapor piping systems and tubing with operating pressures over 125 psig and all liquid systems should be suitable for a working pressure of at least 250 psig and should be at least Schedule 80, if the joints are threaded, or Schedule 40 if they are welded or welded and flanged.

The last part of B.8(a) becomes B.8(b), and gives explicit specifications for aluminum pipe and tubing:

"Aluminum alloy pipe shall be in accordance with specifications ASTM B-241 except that the use of alloy 5456 is prohibited. Copper tubing may be of the standard grade K or L, or equivalent, as

covered in specifications ASTM B-318. Aluminum alloy pipe and tubing shall be suitably marked every 18 in., indicating compliance with appropriate ASTM specifications. Copper and aluminum alloy tubing shall have a minimum wall thickness of 0.032 in. Aluminum alloy tubing and piping shall be protected against external corrosion when (a) it is in contact with dissimilar metals other than galvanized steel, (b) its location is subject to repeated wetting by such liquids as water (except rain water), detergents, sewage or leakage from other piping, (c) it passes through flooring, plaster, masonry, or insulation. Galvanized sheet steel or pipe galvanized inside and out may be considered suitable protection. Aluminum alloy pipe and tubing shall be limited to $\frac{5}{8}$ -in. nominal tubing size or $\frac{3}{4}$ -in. nominal pipe size and shall not be used for pressure in excess of 20 psig. Aluminum alloy pipe or tubing shall not be installed within six in. of the ground."

Another reference to aluminum is made in an addition to B.8(f), formerly B.8(e). It specifies that aluminum fittings should be used with aluminum pipe or tubing and that insulated fittings should be used when aluminum connects with dissimilar metal.

Section B.9, Hose Specifications, has been completely reworked. Hose must now be resistant to LPG in both liquid and vapor phases.

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Hose subject to container pressure must be marked: "LPG" or "LP-Gas" at least every 10 ft, designed for a bursting pressure of at least 1250 psig, and approved by Underwriters Laboratories, a nationally recognized testing lab, or the authority having jurisdiction. Hose connections subject to container pressure must be capable of withstanding a 500 psig pressure test.

The paragraph on using hose on the low pressure side of regulators — formerly B.8 (h) — now specifies that such use should be for "other than domestic and commercial gas appliances." Such hose should not be over 6-ft long and should not be used where temperatures exceed 125 deg. F. Use of rubber slip ends is not permitted. The hose cannot pass through walls, partitions, ceilings, or floors, and cannot be concealed or used in a concealed location.

Paragraph B.10(f) which previously restricted the use of shut-off valves between safety relief valves and the container, now also restricts their use between the safety relief valve and the equipment or piping to which it is connected.

Section B.11, Vaporizer and Housing, contains a number of changes and additions, the most important being the inclusion of drop drying. A new paragraph on the dryers, B.11(e), contains 11 paragraphs, and is nearly a full page long. The vaporizer section of vaporizer-burners used for dehydrators or dryers must be located outside of buildings. Construction should include: a minimum design pressure of 250 psig with a safety factor of five, manually operated shut-off valves at the container to shut off all flow, manual turn-off to the main burner and pilot, automatic device to shut off gas to burner and pilot if pilot is extinguished, and ferrous metal or high temperature alloy vaporizer coils or jackets. Both the hydrostatic relief valve protecting the vaporizer section and the pressure regulating and control equipment should be located so surrounding temperatures do not exceed 140 deg. F. The

vaporizer section should not be provided with fusible plugs. Minimum storage container distance from the vaporizer burner should be 10 ft for a container of less than 501 gal., 25 ft for a container of 501 to 2000 gal., and 50 ft for those above 2000 gal. Regulating and control equipment downstream of the vaporizer should be designed to withstand the maximum discharge temperature of the vapor. Equipment using vaporizer-burners should have automatic shut-off devices upstream and downstream of the vaporizer—and should operate in event of excessive temperature, flame failure, and insufficient air.

In section B.12, Filling Densities, the maximum permitted filling density table, has been abridged to coincide more closely with the range of specific gravities of LPG.

Section B.14, Transfer of Liquids, has two new paragraphs. One calls for bleeder valves on unloading piping or hose, where necessary. The other says:

"Pump installations shall include a recirculation device which shall limit the discharge pressure to not over 125 psi greater than the safety relief valve setting for the container supplying the pump, unless the pump is not capable of exceeding this pressure. If a manual shut-off valve is provided in the recirculation line, such valve shall remain in the open position, except during an emergency or when repairs are being made to the system."

An addition to B.18(b), Liquid Level Gauging Device, specifies that "Each container of 2000 water gal or less, manufactured after July 1, 1961, which is filled by volume and gauged by a magnetic-type gauging device, shall also be equipped with a fixed-level gauge to determine the maximum allowable filling point."

A new paragraph in B.19, Requirements for Appliances, states that in cases where no applicable standard has been developed for an appliance or accessory, approval of the authority having jurisdiction may be required before installation.

Division I

No changes to this "Cylinder Systems" division.

Division II

Of the six changes made in this division, "Systems Utilizing Containers Other Than I.C.C.," one has considerable significance. A new paragraph under section 2.2, Container Valves and Accessories, Filler Pipes and Discharge Pipes, specifies that containers of 125 water gal and above, manufactured after July 1, 1961, must have a $\frac{3}{4}$ -in. minimum approved devices for liquid evacuation. A plugged opening will not do.

Division III

Hardly a paragraph has escaped revision and five new sections have been added. Now called "Truck Transportation of Liquefied Petroleum Gases," this division now covers both transportation and combination transportation-storage units.

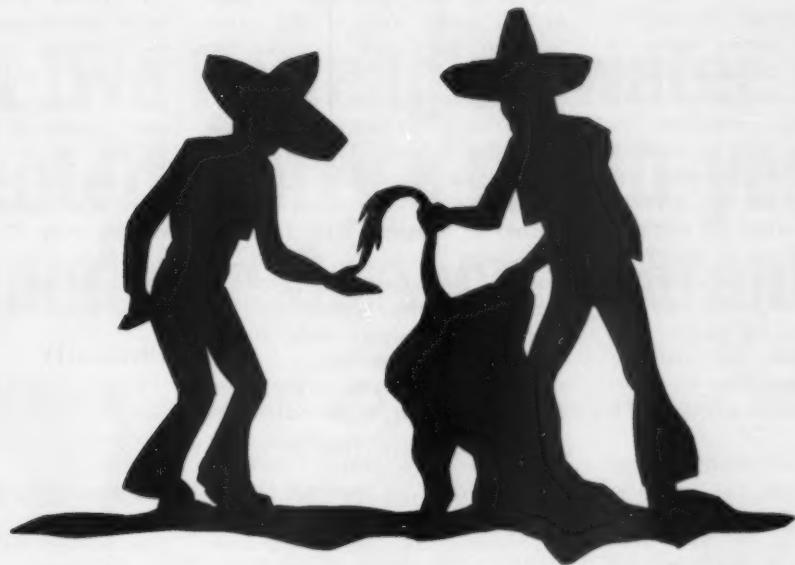
In 3.1, Design Pressure and Classification of Cargo Tanks, a footnote states that construction of containers under the API-ASME Code is not authorized after July 1, 1961.

In section 3.2, Cargo Tank Valves and Accessories, paragraph (a) has been greatly expanded, now reads:

"Non-recessed container fittings and appurtenances shall be protected against damage by either: (1) their location, (2) the vehicle frame or bumper, or (3) a protective housing. The protective housing, if used, shall comply with the requirements under which the tanks are fabricated with respect to design and construction and shall be designed to withstand static loadings in any direction equal to twice the weight of the tank and attachments when filled with the lading, using a safety factor of not less than four, based on the ultimate strength of the material to be used. The housing shall be provided with a weather cover if necessary to insure proper operation of valves and safety devices."

Additions to Section 3.3, Piping and Fittings, prohibit the use of aluminum alloy pipe or tubing and specify that ferrous threaded pipe shall not be less than Schedule 80.

In section 3.6, Transfer of Liq-



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uids, a new paragraph restates:

"When hose is carried connected to truck liquid pump discharge piping, an automatic device, such as a differential regulator or equivalent device, shall be installed between the pump discharge and the hose connection to prevent liquid discharge when the pump is not running. When a meter is used, the device shall be installed between the meter outlet and the hose connection. An excess flow valve may be used, but shall not be used as the exclusive means to accomplish the requirements of this paragraph."

Section 3.7, Mounting Cargo Tanks on Vehicles, has been rearranged and expanded. The former paragraphs on "stops" and "hold down" devices have been combined with the added word of caution that such devices must not introduce undue concentration of stresses. A new paragraph states that when the cargo tank is designed and constructed to take all or part of the stress usually taken by a frame, it must be designed to take those stresses in addition to those covered by the code. However, probably the most important paragraph in this highly important section is the first, which states:

"The means of attachment of any tank to the cradle, frame, or chassis of a vehicle shall be designed to withstand static loading in any direction equal to twice the weight of the tank and attachments when filled with the lading using a safety factor of not less than four, based on the ultimate strength of the material to be used."

Extinguishers Required, section 3.12, now spells out specific requirements: for a cylinder truck, at least one extinguisher with an 8-B,C rating; for a tank truck or tractor, at least one 12-B,C extinguisher or two or more 6-B,C units.

Among the new sections in this division, two—3.16 and 3.17—are Painting Cargo Tanks on Vehicles and Marking Cargo Vehicles. The first specifies that a light reflecting paint should be used for the upper two-thirds of the tank. The second specifies that the words "Flammable Compressed Gas" or "Flam-

able Gas," at least 3-in. high, must appear on both sides and the rear of the tank. And in the same locations, the words "Liquefied Petroleum Gas," "Butane," or "Propane," must be at least 2-in. high.

The next two sections are also somewhat related, Transportation of Portable Containers, 3.18, and Transportation of Division II Containers or Systems, 3.19. Portable containers must be secured to prevent movement and physical damage, and their valves must be protected. Containers under 200 lb we may be transported in a horizontal position, but larger ones must have their relief valves in direct contact with the container's vapor space. Non-portable containers must also be securely braced and protected from damage. Other stipulations are that lifting lugs should not be used as the exclusive means of lifting the containers and that movement of containers more than five per cent full is subject to the limitations of the authority having jurisdiction.

Another new section, Movable Fuel Storage Tenders or Farm Carts, 3.20, specifies: that all piping and fittings should be protected from collision or upset damage, that threaded pipe shall not be less than Schedule 80 and fittings should have a design pressure of not less than 250 psig, and that on a public road.

these units shall not be refilled

The last new section in this division, 3.21, is an extensive one on Parking and Garaging LP-Gas Tank Vehicles. Except for emergencies, deliveries, and meal or rest stops — when it should be well-lighted if after dark—a tank vehicle should not be left unattended on any street or alley. Tank vehicles containing product should not be garaged in any building unless the structure was designed for that purpose or approved for that purpose by the authorities having jurisdiction. If a vehicle containing product is in a garage, repair work should not be done on either its container or its primary shut-off valves. Also included are five essential precautions to be followed when garaging a tank vehicle for chassis or engine service: (1) Close all primary shut-off valves and vent

liquid and vapor prior to garaging; (2) Check for and repair any leaks before garaging; (3) Gauge to determine container is not over-filled and if it is, correct situation before garaging; (4) Do not park near source of heat or flames or in path of hot air blower; and (5) Instruct responsible party in garage of nature of contents and of necessity to avoid tampering with tank or fittings, unless product has been emptied and pressure reduced to atmospheric.

Division IV

Devoted to "Liquefied Petroleum Gas as a Motor Fuel," this division has three changes and one addition. The biggest change is in section 4.5, Piping, Tubing, and Fittings. It specifies that any wrought iron pipe between the fuel container and the first stage regulator should not be less than Schedule 80.

The addition is a new section, Garaging LP-Gas Fueled Vehicles (4.11). It states that such vehicles may be garaged if there are no leaks in the fuel system and if the tanks are not filled beyond maximum. When such vehicles are being repaired in garages, the container shut-off valve should be closed except when fuel is required for engine operation. And such vehicles should not be parked near sources of heat, open flames or pits, unless the last are adequately ventilated.

Division V

Formerly "Storage of Containers Not Installed For Use at Final Utilization Point," this division is now "Storage of Containers Awaiting Use or Resale." Shortened somewhat and extensively revised, it now contains twice as many sections and is no longer recognizable. The introductory paragraph states that the division applies to "portable containers of less than 1000 lb wc, filled or partially filled, at user location but not connected for use, or in storage for resale by dealers or resellers."

An opening General section contains five specific points. First, containers should be located to minimize exposure to excessive temperature rise, physical damage, or tampering. Second, when stored indoors, they should not be near

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exits, stairways, or other areas used for exit purposes. Third, whether filled or empty, cylinders requiring valve caps should have them in place. Fourth, the outlet valves must be closed. Fifth, empty containers which have been in service should preferably be stored in the open, but if stored inside, they should be considered as full containers when determining the maximum to be stored in the building.

The second section, Storage within Buildings Frequented by the Public, more liberally allows 2½-lb cylinders to be displayed and stored with a maximum of 24 units of each brand and size and an overall maximum of 200 lb of such storage.

The third section, Storage within Buildings Not Frequented by the Public, specifies that storage in industrial buildings and such should not exceed 300 lb, except as provided in section 5.4. Containers that are part of the service equipment on highway mobile vehicles are not to be considered in the 300-lb limit, provided they are stored in private garages and are limited to one 100-lb-or-less container per vehicle.

Section 5.4, Storage within Special Buildings or Rooms, contains nine provisions. One, the quantity stored shall not exceed 10,000 lb. Two, walls, floors, and ceilings adjacent to or within other parts of the building shall have at least a two-hour fire rating. Three, at least 10 per cent of the walls and roof area should be of single strength glass or similar explosion-relieving construction. Four, each opening to other parts of the building shall have a 1½-hour fire door. Five, such rooms should have no open flames for heating or lighting. Six, such rooms shall be adequately vented, top and bottom, with vent openings at least five feet away from any other building opening. Seven, the floor should not be below ground level and the space below it should be either solid fill or properly vented to the outside. Eight, such rooms should not adjoin the property line of public gathering places. Nine, the electrical installation should be in accordance with the

National Electrical Code, Articles 500 and 501, Class I, Division 2.

When the quantity to be stored exceeds 10,000 lb, section 5.5 Storage Outside of Buildings, comes into effect. This material closely follows the pertinent parts of the present pamphlet.

The final section in this division, Fire Protection (5.6), specifies that storage locations other than supply depots located apart from dealer, reseller, or user establishments, must have at least one portable fire extinguisher with a minimum rating of 8-B.C.

Division VI

This division is now titled "LP-Gas System Installations on Travel Trailers or Mobile Homes," instead of the former "Cylinder Systems for Cooking, Heating and Refrigerating Installations on Highway Mobile Vehicles." The title change indicates the principal change in content—this division is now devoted only to travel trailers and mobile homes. Thus, most of the changes are merely deletions of material not pertaining to these two classes of vehicles. There are, however, a number of additions and changes worthy of note.

In section 6.4, Location of Containers and Systems, an exception is made to the rule the LPG containers may not be stored—even temporarily—inside a trailer or mobile home. That exception is the 2½-lb cylinder used for torches, lanterns, etc. Another change in this section is that when cylinders are stored in an outside recess, this compartment must be ventilated at both top and bottom.

In 6.8, System Enclosure and Mounting, the road clearance specification is changed to simply read that neither the container nor its support may extend below the frame.

In 6.9, Piping, Tubing, and Fittings, there are three small changes. Paragraph (a), no longer specifies that regulators shall be "of lightweight construction." In paragraph (c), the blanket prohibition of aluminum tubing has been relaxed to allow listed aluminum appliance connectors. In paragraph (f), the sentence calling for an approved flexible connector or expansion loop between the fuel line

and the appliance has been deleted.

A completely new section, Test of Piping for Tightness, (6.10), is the biggest single change in this division. Two tests are required. Before appliances are connected, the piping system must stand 6 in. mercury or 3 lb gauge for not less than 10 minutes without pressure drop. After appliances are connected, the test must be repeated with the pressure at 10 in. wc. The mercury or water manometer or slope gauge must read in increments not greater than 1/10 in. or lb. The source of pressure must be isolated before the test.

The Appliances section, 6.11, has two changes. Paragraph (b), now contains an important new word, "all," changing one sentence to read "All air for combustion (for heating appliances and water heaters) shall be taken from outside the vehicle." The second change is the rewording of former paragraph (d), to read:

"Except for range top burner sections and gas lights, all gas-fired appliances shall be protected with an automatic pilot device. Such automatic pilot devices shall be of the complete shut-off type."

The General Precautions, 6.12, include a new paragraph. It states that requalification of containers for continued service is the responsibility of the owner. The requalification date should be stamped on the cylinder. When ICC cylinders are requalified, such retests should be made on equipment approved by the Bureau of Explosives, Association of American Railroads.

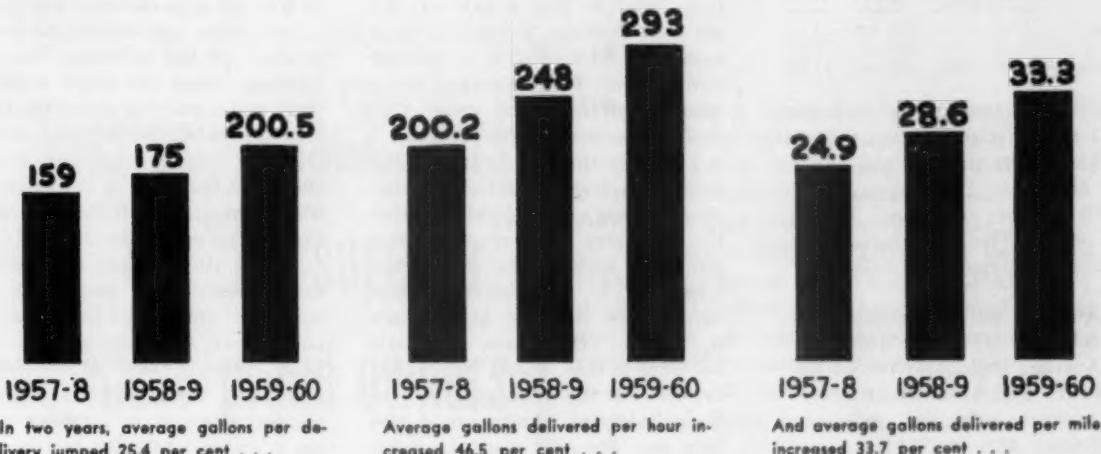
Division VII

A new division, this one is titled "LP-Gas System Installations on Commercial Vehicles." The introductory paragraph states that it applies to commercial, construction, or public service vehicles, such as mobile libraries and clinics.

Generally speaking, this paragraph breaks very little new ground. Its sections and contents closely follow both the present and the revised Division VI. Where it differs from the new Division VI, it is usually in material which is being picked up out of the present Division VI because it pertains to

(continued on page 85)

A BPN Exclusive



How to make more money on your gas deliveries

New truck and plant plumbing, a degree day system, and two-way radio increased one company's per-truck fuel deliveries by nearly 50 per cent.

THIS IS A TRUE STORY OF RAY and JOE, a couple of driver-salesmen—and how their company increased their work output, their income, and its own profits as well.

The story had its start in the 1957-8 winter season. During the six fall and winter months when deliveries were at their highest—October through March—Ray and Joe together delivered slightly under a half million gallons. Ray delivered 245,976 gals., Joe 231,672.

Here are their delivery performance figures for the six months:

	Hrs. worked	No. del'y's.	Gals. del'd.	Miles
Ray	1185	1500	245,976	10,090
Joe	1187	1498	231,672	9,253
Totals	2372	2998	477,598	19,343

Between them they compiled the following averages:

Average gals. pumped per delivery: 159

Average gals. delivered per hour: 200.2

Average gals. per mile per driver: 24.9

Considering the area in which the company operates, and the nature of the clientele, these averages were quite good. But the company felt they could be improved.

A 100-gpm Smith pump was installed in the plant to speed the truck filling operation. On the suction side, a 3-in. line was installed, fed by two 2-in. lines. A 2-in. line was also installed between the dis-

charge and the filling manifold. A 1½-in. vapor return line was used, replacing a ¾-in. vapor return line. As a result, filling was speeded up to between 85 and 100 gpm, depending upon tank pressures.

With the manifold and additional pump, the plant could now fill both trucks simultaneously, and could also deliver to the trucks while a transport was being unloaded with the same pump.

These improvements were made before the start of the 1958-9 peak season. About two months later a two-way radio was added, which helped speed the men on their routes. At the end of the season, their performance was again measured, as follows:



	Hrs. worked	No. dely's.	Gals. delv'd.	Miles
Ray	1226	1719	308,462	10,612
Joe	1218	1743	297,991	10,643
Totals	2444	3462	606,453	21,255

Between them, they had made 464 more deliveries, had delivered 128,855 more gallons, and had run an additional 1912 miles. All this with only an additional 72 hours of work. Their averages, meanwhile, had risen as follows:

Average gallons pumped per delivery: 175 (vs. 159)

Average gallons delivered per hour: 248 (vs. 200.2)

Average gals per mile per driver: 28.6 (vs. 24.9)

In August of 1959, a degree day system was put in, giving the company better control over individual delivery volumes. Ray got a new truck with a 2500-gal. tank. It was equipped with a 3-in. inlet line to the pump, which was rated at 60-gpm. The pump was matched with a 60-gpm temperature compensating meter and a 1½-in. delivery line. One hundred ft of 1¼-in. hose was used on the power reel.

Another winter came and went, and at the end of March, 1960 performance was once again weighed. Here are the results:

	Hrs. worked	No. dely's.	Gals. delv'd.	Miles
Ray	1267	1814	375,092	11,540
Joe	1218	1834	357,782	10,525
Totals	2485	3648	732,874	22,065

As is obvious, Ray and Joe once again outdid their previous year's records. Between them, they made 186 more deliveries, pumped 126,421 more gals., while putting on 810 more miles. This was accomplished in only an additional 41 hours of work.

Here's what happened to their averages:

Average gals. pumped per delivery: 200.5 (vs. 175)

Average gals. delivered per hour: 293 (vs. 248)

Average gals. per mile per driver: 33.3 (vs. 28.6)

In two years, the average gallons pumped per delivery increased from 159 to 200.5, a 41.5-gal. jump, or 25.4 per cent. The average gal-

lons delivered per hour went up from 200.2 to 292, a gain of 46.5 per cent. Average gallons per mile rose from 24.9 to 33.3, a 33.7 per cent gain. The average hours worked increased only from 2372 to 2485, or less than 5 per cent.

Translate this into your own dollar figures, and no matter what figures you use, you'll quickly see that the increases add up to a tidy profit. At such a rate, it wouldn't take long to amortize the added investments involved in the new equipment. (Of course, it should be added that there are other drivers in the company, too, so their improved results would also help pay for the plant improvements, the radio, and the degree day system.)

There's an "if" in the above figures, however. Provide the best equipment available, but it still might not perform if you don't have the right men. The company has the right men in Ray and Joe. They were good men to start with, but the company made them even more valuable through its employee benefits program.

First, all driver-salesmen (as well as other personnel) are given a free coffee and doughnuts break to start off the morning. This effectively cured the habit some of them had a meeting down the road at a convenient diner every morning. The few minutes lost in the office each morning is insignificant when compared with the time they used to spend in the diner.

Second, the company set up other fringe benefits for employees. All men get time-and-a-half for all hours over 40 hours a week, six paid holidays, and group insurance. The company pays the employees' rate and the employee pays the additional rate for family coverage.

Third, for Ray and Joe (and other drivers in the delivery step-up program) there's a bonus for exceeding their quotas. Ray, with the bigger truck, has a 55,000 gal. per-month quota. Joe's is 50,000. As soon as each passes his quota, he is paid ½ cent per gal. for any additional gas delivered. In one month, Ray made \$115 over his salary. ■

Cotton moisture problem solved

THE PROBLEM OF OVERDRYING OR UNDERDRYING COTTON can now be eliminated according to North Texas Tank Co. of Denton, Texas, which is now producing an automatic humidity heat control system. The system includes a burner arrangement with humidity controls in place of temperature controls. The humidity controls regulate three separate banks of burners which require only 10 oz. of gas pressure. The burners are adaptable to LPG.

The slightest variation from the ideal moisture content instantly cuts off or adds a bank of burners, eliminating over- or underdrying. When the ideal level of humidity is attained, no heat is required. Overdried cotton automatically breaks the circuit.

Heat is extracted from two humidity testing locations in the gin stand, where the cotton enters the dryer, and where the

cotton leaves the dryer. The test air meets at a "T" joint where it mixes and continues through a single duct to the sensitive heat control tower. Here the duct connects with nine flues where the air is continually blown around, thus maintaining a constant temperature.

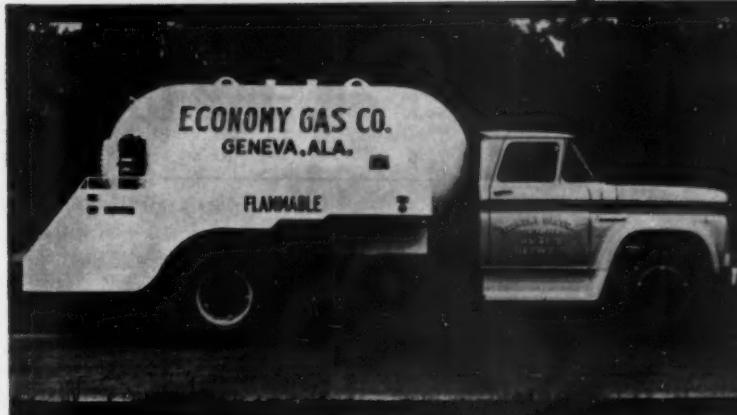
The sensing elements are arranged one above the other and are housed in a dome shaped exhaust head connected to the nine flues. The air is delivered here and exhausted at one to two ounces of pressure.

The sensitivity of the control system not only provides ideal cotton ginning humidity control but in case of pilot or power failure, or clogged ducts, the control will automatically cut off. In case of fire it will automatically activate extinguishers in dryer or duct.

The system is being distributed by Nor-Tex Products Co. ■

Mississippi Tank units are "far superior" say these proud owners

When it comes to good looks, economy of operation and dependability, there's nothing to compare with Mississippi Tank delivery units agree these progressive operators. And while they own different models, like all Mississippi Tank units both are designed with one thought in mind: to help LP Gas dealers cut delivery expense. May we suggest you take a cue from these cost-conscious companies? Investigate the money-making possibilities of high-capacity, trouble-free Mississippi Tank equipment today!



"Based on the excellent performance of our Titan, Jr., we will definitely buy another Mississippi Tank unit the next time we expand our fleet," reports Paul Ulivi, owner of Ulivi Gas Company of Coal City, Ill. Mr. Ulivi says that the new Titan, Jr., carries about 20% more payload than his old-type equipment, with resulting savings in truck fuel, time and labor.




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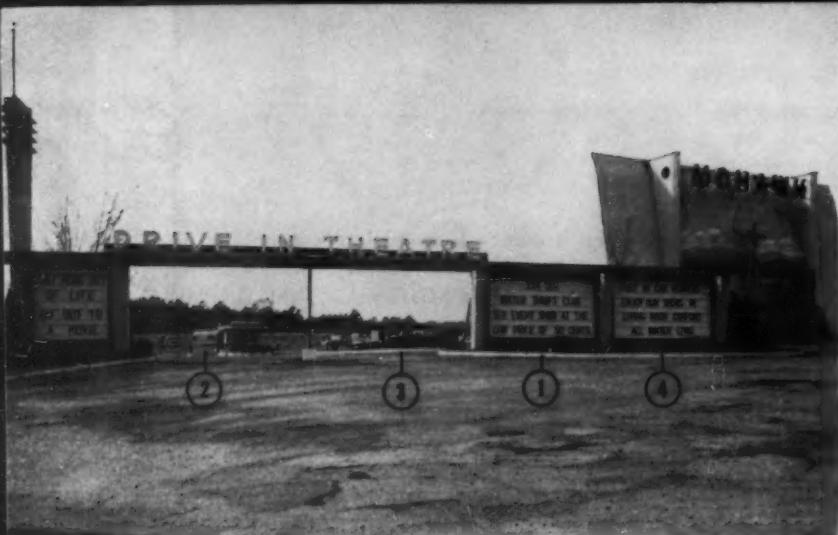
Delivery Units Lightweight Transports
 Domestic and Bulk Storage Tanks

Name _____

Company _____

Address _____

City and State _____



It was all as simple as 1, 2, 3, 4. A movie operator smart enough to start a Winter Thrift Club (1) was smart enough to provide in-car radiant gas heaters from a small house trailer (2) directly behind the box office. The heaters' one-pound cylinders are shuttled to an on-site filling station each day in a pick-up (3). The entire operation is so inexpensive that the operator can provide the heater service without charge, giving him another big advertising point (4).



Mohawk manager George Lourinia (above) shows how the 2600 Btu radiant heaters are passed through the customers' window at the box office. The one-pound cylinders (below) for the heaters are filled in this explosion-proof filling-shack from a 1000-gal. tank.

In-car heaters are ticket to large year-around load at drive-in theatre

WALTER E. DONOVAN • Advertising Manager, Fuelane Corp.

IN THE MIDDLE OF THE RECORD-BREAKING RIGORS OF THE NORTHEASTERN WINTER just past, it was almost like June in January at the Mohawk Drive-In Theatre in Albany, N. Y. In-car gas heaters provided cozy, comfortable living-room warmth for an entire car-full of viewers, even during the coldest nights. The Mohawk never closed—except when a blinding snowstorm would make it impossible to see the screen.

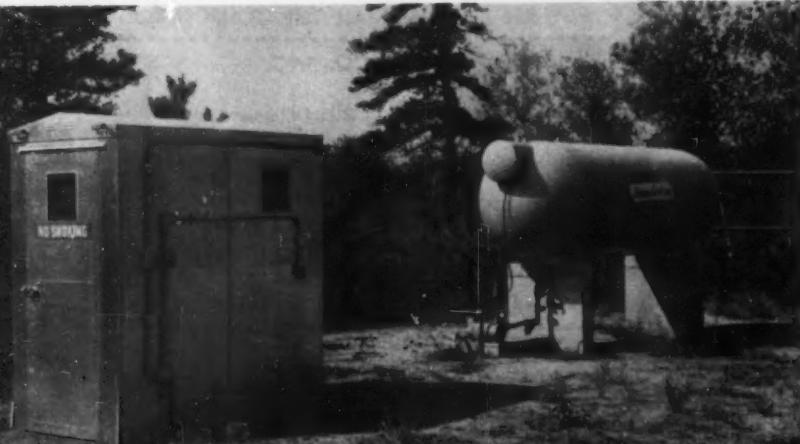
And—while providing comfortable entertainment for Mohawk customers and year-around patronage for the management, the in-car heaters were proving to be a highly

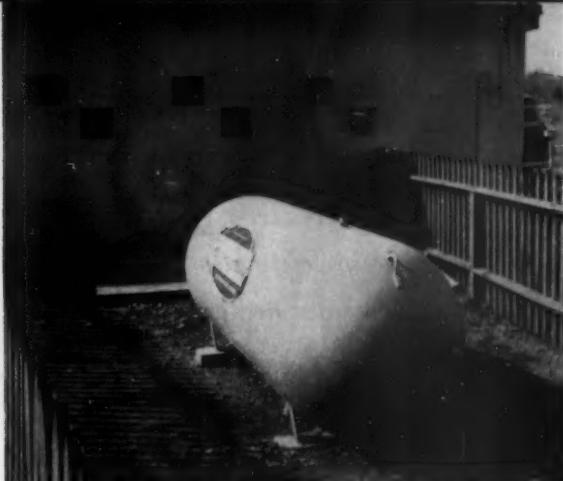
successful ticket to a year-around load for Seven States Gas Co., a division of Fuelane Corp. (Liberty, N. Y.)

Before in-car heaters were installed, the 1000-car Mohawk closed in October and did not open until Memorial Day. Now, it uses the heaters from September through April and never closes—except for heavy snow or rain storms.

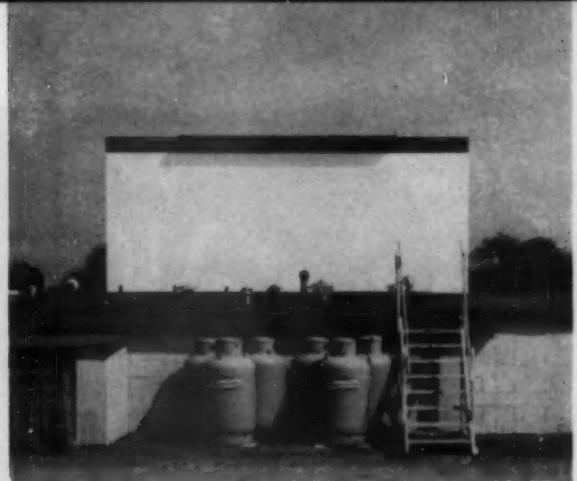
One of the things which helped persuade the Mohawk management to stay open all year was the high cost of annually opening and closing the theatre. During the winter, all equipment must either be stored or properly maintained. In spring, this equipment must be brought out of mothballs and serviced. By eliminating closing and reopening costs, the theatre says it can offer free in-car heater service, actually lower prices, and still come out ahead.

Before deciding to use gas heaters, the Mohawk management investigated other types, including oil and electric. Gas was chosen because of its dependability, low cost, odorless operation, and safety. Electric heaters require a cord which





During the movie, the projection room is kept warm by gas from this 500-gal. tank.



During intermission, patrons buy food cooked with gas in a building heated with gas, all of it coming from the six 100-gal. cylinders.

presents a possible shock hazard. And damage can be done by cars that are driven off with the heater still in the vehicle. Anyway, electricity was too expensive. Oil was not seriously considered once the advantages of gas became evident.

The heaters chosen are a radiant unit producing 2600 Btu. Safe and odorless, they have been thoroughly tested and approved by both the U. S. and Canadian underwriters' laboratories. They are said to be so safe that gasoline will not ignite when thrown on a unit in operation.

The heaters are fired prior to each evening's performance. Firing is a simple procedure: an attendant turns a valve with an Allen wrench, allows the unit to stand for one minute, and starts it up with a push-button torch, applied for five or ten seconds. It is then ready for

a full evening of service.

The customers pick up the heaters while they buy their tickets—with out getting out of the car. There is no charge, but a second heater, if requested, costs 15 cents. The heaters are in full operation when the customers get them. They need no complicated operating instructions, since the temperature of the car is controlled by raising and lowering windows. When the customers leave, they drop off the heaters at the box office.

Between performances, the heaters are stored in racks in a small house trailer immediately behind the box office. During the day, their one-pound cylinders are detached and taken in a pickup to an explosion-proof filling shack. Adjacent to the shack is a 1000-gal. tank. A chain-link fence, topped by barb

wire, encloses the entire cylinder-filling area.

While Seven States' local sales manager, Kenneth Drobner, was recommending the gas in-car heaters, he also recommended that LPG be used for heating all structures around the drive-in and for cooking and water heating.

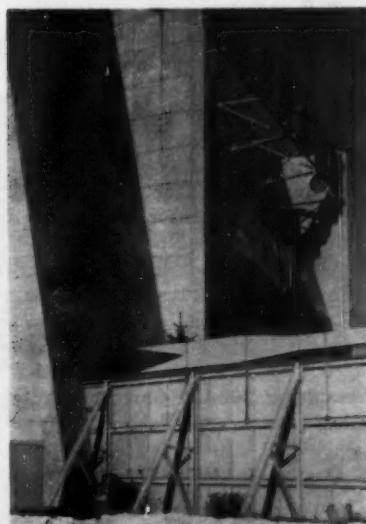
The management took Drobner's advice and has been happy with its decision. Seven States installed all necessary equipment and appliances. Now, gas heats all of the following: the heater, storage trailer, the box office, the generator room, all rest rooms, the projection booth, the concession building (with two 75,000-Btu floor-model heaters), and the work shop. It also operates an 80,000-Btu pizza oven, a 60,000-Btu griddle for hot dogs and hamburgers, and a 50,000-Btu deep fat fryer for french fries.

This sizeable load requires—in addition to the 1000-gal. tank—a 500-gal. tank and eight 100-gal. cylinders. All gas is delivered by bulk truck. Seven States, incidentally, supplies heating and cooking gas to other drive-ins in the area and some of them are now considering using in-car heaters so they, too, can become year-around businesses.

The end to this little success story is given a nice wrap-up by a happy little reciprocal agreement. Since Seven States supplies most of the area served by Mohawk, it patronizes the theatre by buying time for its Happy Cooking Metered Gas Service movie commercial during intermission. ■

On their way out, the customers see one last 100-lb. cylinder, which supplies heat for the workshop under the giant screen.

Patron to whom Lourinie was handing the heater is still alongside the box office and there's a 100-lb. cylinder in background.



BPN digests 5 AGA papers on heating and cooling

*Original presentation
was at the AGA
Research and
Utilization Conference
held in Cleveland,
April 4-6*

- • • *gas cooling*
- • • *house heating*
- • • *gas vs. electricity*
- • • *gas heating estimates*
- • • *supplemental heaters*

The heat's on for gas cooling

IN 1954, THERE WERE FOUR MANUFACTURERS OF GAS AIR CONDITIONING EQUIPMENT. Today, there are 12 and the eight new manufacturers are making new types of equipment and new sizes. This greater variety, plus a greatly expanded promotion program and the increasing acceptance of air conditioning as a necessity, is certain to build summer load.

Two projects in the residential-size field bear watching. Whirlpool Corp. is working on an absorption unit, concentrating on four design goals: (1) competitive first cost; (2) compactness and light weight; (3) an efficiency of one-half Btu of refrigeration per Btu of fuel, and (4) cooling with air. Three three-ton lab models have been built. They meet the performance goals, but the size and cost standards are still under attack. AGA and the Onan Division, Studebaker-Packard Corp., are in the final-field-test stage with a 5-ton, long-life, air-cooled engine-compressor unit. Three gas companies are testing 20 units this summer. The basic engine-compressor package, ready for assembly into a complete air conditioning unit, will be available in production quantities in 1962.

In commercial-industrial sizes, there are many more developments. Statham-Swearington Inc. has developed a lithium bromide absorption unit with a double-effect generator that reduces fuel costs nearly 50 per cent. It is building 15-ton units now and expects to build models up to 50-tons by the end of this year. Bell and Gossett Co. is building engine-driven 7½-to-150-ton equipment and has heat pumps in the planning stage. Worthington Corp. and the AGA are building a 50-ton gas-engine-driven heat pump that will be installed in a building this fall for extensive testing.

One of the most exciting prospects in the commercial-industrial field is the gas turbine. An AGA-Solar Aircraft Co. project has these performance goals: (1) one Btu of refrigeration per Btu of fuel, (2) \$50- to \$100-per-ton initial cost, (3) factory-packaged unit of the smallest practical size, (4) long life capability and minimum maintenance, and (5) acceptable noise level. A 250-hp single-shaft, radial-flow turbine was coupled to a freon compression system and the resulting 200-ton unit went into initial operation last December. Both Solar and

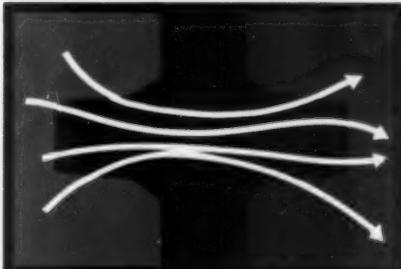
NEW

FROM

bryant

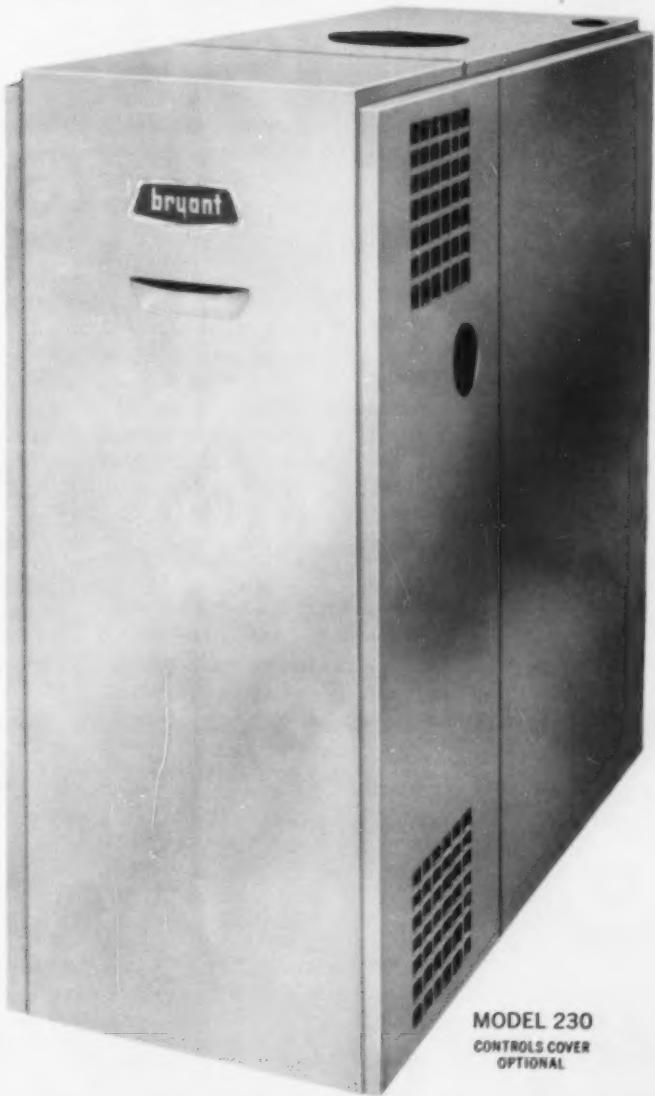
TWO-INCH CAST IRON **GAS BOILER**

*introducing a new idea
in rapid heat transfer*



**THERMAL
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Amazing Thermal
Pins speed heat trans-
fer from flue gases
into boiler water.



HOT SELLING FEATURE

NEW BRYANT BOILER SECTION STUDDED WITH THERMAL PINS!

Developed by Bryant research and field tested for a full year, Thermal Pins are cast into the section wall — inside and out. They extract more heat from the gases and transfer it faster into the water; better in heat absorbing properties than conventional design.

8 FEATURES MAKE BRYANT EASIER TO SELL

LIGHTER BOILER is made possible by the Thermal Pin design; is easier to handle in the shop and on the job.

EASY ON FUEL. The new boiler responds quickly to the thermostat; has a shorter operating cycle; saves fuel.

COMPLETELY PACKAGED UNIT — comes all ready to hook up.

BUILT-IN WATER HEATER, factory installed, supplies plenty of hot water (3 to 4.4 gpm) the year 'round.



CONTOURED INTERNAL VANES (21 per section) also set up heating efficiency and strengthen boiler structure. Controlled water flow extracts all usable heat.

EXCLUSIVE BRYANT DIAPHRAM GAS VALVE AND PILOT are still the standard of safety and performance.

BRYANT CAST IRON BURNER. Efficient and quiet.

CAPACITIES. 75,000 to 225,000 Btu.



the company on the move!!!!!!

BRYANT MANUFACTURING COMPANY • Indianapolis 7, Indiana



NEW! BRYANT HYDRONICS MANUAL

Developed for Bryant dealers. It takes the guesswork out of system design, proper boiler and pipe sizing; shows correct installation methods that assure a highly efficient hydronic system. It will save you untold time, money and customer gripes.



It's available through your Bryant Distributor or Factory Branch.

12 REASONS WHY DEALERS LIKE BRYANT

1. Most Complete Line.
2. Exclusive selling features.
3. Fast Delivery.
4. Most flexible financing and credit aid.
5. On-the-spot counsel.
6. Sales and technical training.
7. Business management guidance.
8. Local ad campaigns.
9. Sound sales policies.
10. National reputation.
11. Gas air conditioning.
12. Bryant's financial strength.

AGA papers

AGA are very optimistic, since it appears that the unit will operate for long periods without maintenance and several seasons without major overhaul.

Besides Solar, many other companies, including AiResearch, Pratt & Whitney, and Boeing, are working on gas turbines to supply not only air conditioning, but heating and electricity for hospitals, schools, factories, etc.

Whereas recent air conditioning research has been of the development type, future research should be basic, seeking new ideas, new approaches, new ways. Much basic research still needs to be done on absorption systems and jet pumps. A gas window-type air conditioner is a definite possibility in the somewhat distant future. It will probably come about through use of thermoelectric or fuel cell units.

While every effort is being made to keep air conditioning research progressive, there is no need to wait for future developments. There is plenty of good equipment available right now—and in more sizes than previously.

C. W. WILSON

Senior Research Chemist
Baltimore Gas & Electric Co.

Our competition's house heating

THE TREND OF DEVELOPMENTS IN THE ELECTRIC AND OIL HEATING INDUSTRIES may dictate gas heating equipment designs of the future, so their advances should be studied.

The electric heat pump is one of the most efficient means of electric heating, but its capacity and efficiency decrease as the outside temperature decreases. Therefore, its use is limited to mild climates, unless it is supplemented with electric resistance heat.

Most of the types of electric resistance heat are well known, but one of the newest is reinforcing wire. The same 1/6- to 1/4-in. wire, placed 6 in. apart in a concrete slab, both reinforces the slab and provides heat.

Off-peak electric heat storage

tries to beat high rates by storing heat in the home during the night. Three methods are possible. Most immediate is a hot water storage tank, rather bulky and expensively insulated. Water would be heated as high as 375 degrees F. and would pass through a heat exchanger, as needed. In the research stage are metal slabs located in stud spaces. They would be heated during off-peak periods and air would be circulated over them as needed. Probably farther in the future is heat storage in chemicals.

Two oil heating developments, induced draft, and pressurized combustion chamber, are merely residential adaptations of features found in large steel boilers. Both eliminate the need for a natural draft and therefore enable a vent pipe to be substituted for a chimney. Besides the obvious saving in chimney cost, both are also claimed to have several other advantages: instant draft, no down draft, higher efficiency, and lower standby loss. In addition, induced draft proponents claim the advantage of having the combustion zone operating at less than atmospheric pressure at all times.

Six different oil burners are in different stages of development. The Pyrocore burner burns vaporized oil in an exceedingly small combustion chamber tube resembling an oversized gas mantle. It requires only a 1-in. vent pipe and when it is adapted to a boiler, exit temperatures of the products of combustion are claimed to be only 125 deg. The Gulf Oil Corp. burner consists of an air-aspirating nozzle, a perforated stainless steel flame tube, an air pump, an oil pump, and an igniter. Putting out 14,000 to 70,000 Btu, it is said to be able to convert gas-designed equipment. The Shell Oil Co. blue flame burner puts out the same range of heat and is said to be clean and silent: It atomizes, then vaporizes the oil, producing an oil gas which is mixed with secondary air. The Bottrill oil burner uses electrical initial ignition and an induced draft, produces from 14,000 to 200,000 Btu. It mixes oil and air, preheats them in a glass tube in the combustion chamber, then burns them in a refractory-lined chamber. The Palco oil burner also preheats an air-oil mixture in a vaporizing chamber.

The mixture is blown through ports in the burner where it produces a blue flame and 35,000 Btu. The Waller oil burner converts fuel oil into a stable gas which, so it is claimed, can be burned in gas equipment with no chimney—merely a 1-in. vent pipe—since fuel temperatures are only 125 deg. It is further claimed that this burner can use just about any kind of liquid fuel and requires no adjustment from one fuel to another.

The gas industry should be striving for the features frequently claimed by many of the preceding oil and electric units: (1) elimination of chimney cost, (2) higher combustion efficiency, (3) lower standby loss, (4) adaptability to add-on rooms and spaces that may be heated infrequently, and (5) combination equipment for year-round air conditioning.

E. T. SELIG
Director of Engineering
Burnham Corp.

Gas vs. electricity

AT THE CLOSE OF 1960, 700,000 U. S. HOMES WERE ELECTRICALLY HEATED. Electric utility executives have estimated that by the close of this decade, there will be 4,000,000 electrically heated homes, or seven per cent of all homes.

Although the usual electric industry recommendation is 6 in. of insulation in the ceiling, 4 in. in the walls, and 2 in. under the floor; one writer in "Electric Heating and Cooling Magazine" recently recommended 14 in., 8 in., and 10 in. respectively.

NEMA claims an efficiency of 130 per cent for resistance heating. Quite obviously, this is impossible, so any apparent excess over 100 per cent can only be due to heat gains, to maintaining unusually low average house temperatures by turning off heat in certain rooms, and to limiting the fresh air infiltration below that needed for health and comfort. At least one electric utility has abandoned the NEMA formula because of bills way over estimates and has gone back to 100 per cent efficiency.

A simple way to show customers

how expensive electric heating can be is to compare operating cost of both gas and electric heat on a one-million - Btu - of - useful - heat - basis. Multiply the gas cost per therm (100,000 Btu) by 10 and divide the result by the percentage of efficiency, 0.75. To find the comparable cost for electric resistance heating, multiply the rate per kilowatt-hour (3412 Btu) by 1,000,000 and divide the result by 3412. Because the efficiency is rated at 100 per cent, it does not enter into the calculation, since dividing by one changes nothing.

Two recent studies show the comparative operating costs of gas and electricity. Equitable Gas Co. computed the cost of heating a moderate-sized, well-insulated house with a heat loss of 29,300 Btuh. Natural gas, at the rate of 75.8 cents per Mcf, would cost \$60.64 for a season. Electric resistance heating, at 1.65 cents per kWh, would cost \$297.01. That's a cost ratio of 4.9 to 1. Northern Illinois Gas Co. made a well-documented 12-month survey of a three-bedroom electrically heated house that had been thoroughly instrumented for testing and estimated how much it would have cost to heat with gas. The house had a heat loss of 27,056 Btuh and the area has 6953 degree days. With electricity at 1.65 cents per kWh, the actual cost for the year was \$250.64. With gas at 9.2 cents per therm, the estimated operating cost was \$63.46. That's a cost ratio of 3.95 to 1.

The cost of owning heating equipment is another story. In a study conducted by Northern Illinois Gas, electricity had lower figures than gas, but only when gas air conditioning was included. The owning cost of an electric resistance heating installation was estimated at \$198.02 per year, including \$25.92 cents for heating equipment, \$123.18 for air conditioning, \$20.73 for wiring, and \$28.19 for extra insulation. For the electric heat pump, the total was \$257.86, including \$208.94 for the pump, \$20.73 for wiring, and \$28.19 for extra insulation. The all-gas owning cost was \$343.77, including \$36.85 for the furnace, \$299.44 for the air conditioner, \$3.74 for piping, and \$3.74 for fuels.

Combining total heating and cooling energy costs with owning costs give the complete, accurate, realistic picture. Northern Illinois worked out figures for a typical three bedroom house, using its local climate, rates, and costs. It determined that total heating and cooling costs for a fully insulated all-electric home heated and cooled with a heat pump were \$847 per year. Using resistance heating and central electric air conditioning, this figure jumped to \$1064. Using gas for both heating and air conditioning, the figure dropped to \$700. Combining gas heat with electric air conditioning further lowered the figure, to \$591. The most recent study along this line, conducted by Washington Gas Light Co., revealed a similar superiority for gas when total costs were compared: heat pump heating and cooling, \$662; electric resistance heating and electric air conditioning, \$537; gas heating and cooling, \$506; gas furnace and electric air conditioning, \$396; electric resistance heating only, \$367; and gas furnace only, \$231.

Clearly, if owning and operating costs governed all decisions, very little electric heat would be sold.

W. H. LOVING
Technical Services Sales Manager
Washington Gas Light Co.

Gas heating estimates

THERE HAS LONG BEEN A LACK OF AUTHENTICATED INFORMATION COVERING THE COMPETITIVE SITUATION BETWEEN GAS HEAT AND ELECTRIC HEAT, primarily because of the electric industry's failure to substantiate its claims. AGA's Committee on Comparison of Competitive Services, therefore, authorized a thorough study of gas-fired warm air systems, resistance heating, and heat pumps.

To maximize the reliability and applicability of the data, four climate areas were chosen, spanning a wide range of degree day figures: Albany, Ga., 1670; Washington, D. C., 4333; Elizabeth, N. J., 5450;

and Butte, Mont., 9760. Data were obtained from 159 gas-heated homes, 50 resistance-heated homes, and 24 heat-pump homes. The houses were a good cross section, picked at random from utility files. Complete data were secured for each home, from utility meter books, the weather bureau, and professional engineers.

The study started out to answer five questions. Five basic facts have emerged from it: (1) A single, nationally applicable method of estimating fuel consumption is possible. (2) Internal heat gains could not be predicted but their effects are predictable; however, external heat gains could not be evaluated and their satisfactory evaluation appears impossible. (3) Because of the inaccuracy of homeowner reports, thermostat settings do not appear to be reliable factors in preparing fuel estimates and no attempt was made to correlate consumption with thermostat settings. (4) No definite correlation could be established between furnace oversizing and consumption because the data were limited, ratings not always reflecting true input; however, with more data, a satisfactory correlation appears promising. (5) Homeowners generally are not reliable reporters of the degree of comfort provided or the conditions under which the systems operate.

Both of the annual fuel consumption estimating methods in common use today have some shortcomings. The calculated heat loss method uses the seasonal efficiency of the heating system, a figure open to much discussion, if not argument. The degree day method creates some application problems when the estimator fails to understand it completely. Both lead to the desire for fewer auxiliary correction factors.

The irreducible minimum was determined to be:

Annual consumption of fuel or energy, Btu =

$$HL \times K$$

TD

where: HL is the design heat loss of the house, Btuh TD is the design temperature difference, deg F. K is an experience factor, a function of the area's degree days.

"K" is the key. It was estab-



lished by dividing the total energy and fuel input to every residence (heating, cooking, water heating, lights, and other miscellaneous usages) by the residential heat loss per degree of design temperature difference. The field data thus provided a K value for every house for each season in the study. This K, however, is based upon the total input to the house and must be reduced to represent heating input only. The study revealed that the heating K value could be obtained by merely taking 77.5 per cent of the total K value. Accurate average heating estimates can then be made for any area, once experience determines the K value for that area.

This estimate will be an average. Theoretically, half of the fuel bills should fall below that average—with satisfied customers resulting—and half should fall above—with dissatisfied customers resulting. This predicament pinpoints the difference between the proposed estimating method and all other methods. With this method, estimates can combine any degree of accuracy with any probability of satisfaction, all loose ends being tied together with standard statistical methods. The study determined that if an estimator believes the customer to be tolerant enough to be satisfied with a bill 10 per cent over estimate, and that if the estimation is willing to take an 80 per cent chance of the customer being satisfied, he can multiply the K heating value by 1.122. A prepared graph indicates similar multipliers for various probability-of-satisfaction and tolerance-for-error percentages. Thus, the estimator can give the most competitive gas heating estimate consistent with his desired probability for satisfaction and his customer's probable tolerance for error.

For electric heating estimates, NEMA has promoted a very similar formula, K's place being taken by degree days multiplied by the constant, "C." Some electric interests recommend that C be 18.5 while others suggest 12. In this study, C values for individual homes ranged from 3.6 to 48.5, the high and low averages being 26 in Albany and 6.8 in Butte. The committee is confident that when

enough electrically heated homes are available to provide conclusive results, accurate electric K factors can be determined.

In any specific area, only one K exists for any one fuel. Once these K's are determined, simplified and accurate average heating cost comparisons can be made.

W. R. SARNO
Assistant Utilization Engineer
A. G. A.

Gas supplemental heaters

DUE TO CIRCUMSTANCES IN THE HEATING INDUSTRY, a major part of AGA's domestic heating research has been centered on central systems.

Three facts now make supplemental heating worthy of concentrated research efforts. First, a ten-year market study shows that 1.6 million room heaters are sold each year, as compared to 1.3 million furnaces, boilers, and conversion burners. Second, ever-increasing family size and the trend to home entertainment via television and hi-fi have resulted in frantic efforts to expand living space by adding rooms and converting porches, breezeways, garages, etc.; and properly heating this additional space with gas is sometimes most difficult because of the limited variety of available equipment. Third, the problem of supplemental heating is being increasingly solved by electric heaters, whetting the electric industry's appetite for heating—and pre-selling customers on electric heat when their supplementary electric heating works satisfactorily in a limited or occasionally-used installation.

The cumulative effect of these facts has been PAR research project DA-9-HA. In addition to the basic fundamentals of safety, effi-

ciency, and proper heat distribution, there are five design goals: (1) input of 20,000 Btu/h or less; (2) easy installation in new or old construction; (3) a sealed combustion chamber to assure adequate combustion air and dispose of combustion products; (4) attractive or inconspicuous appearance; and (5) reasonable production costs.

A test room is being built at the AGA laboratories in Cleveland to test various gas and electric heaters. A movable wall allows the room area to be changed to match heater size. The walls are air conditioned to simulate outside temperatures. And, adjustable equipment will make it possible to take temperatures at all locations in the room.

The first concrete results of this project were shown at the Hall of Flame exhibit in Atlantic City last October. The first prototype heater is a 10-ft-long direct-fired, baseboard convector unit with an input of 16,000 Btu. With the exception of a 9-in. by 14-in. control cabinet, it looks like a conventional hot water or steam convector unit, extending about 4 in. into the room. A single port, flame-retention-type burner fires into a $\frac{1}{8}$ -in. diameter stainless steel tube enclosed in a $1\frac{1}{4}$ -in. finned heat exchanger through which combustion products return to the exhaust blower. Tests indicate 80 per cent efficiency with heat delivered by natural convection. The second prototype burner is an 11,000 Btu radiant heater. Nineteen inches high, it is $14\frac{1}{4}$ in. wide and extends into the room $3\frac{1}{2}$ in. Two 3-in. by 5-in. radiant burners, operating at 1600 deg., are placed behind an etched glass panel which seals the combustion chamber and reduces surface temperatures to 700 deg. (a safety grill is still necessary, obviously). Also operating at 80 per cent efficiency, this unit supplies half of its heat by radiation and half by convection. It may be mounted at any height.

Three additional supplemental heaters are now in the works at the AGA labs and several more are planned before the project is completed.

C. L. ELLIOT
Supervisor
Residential Heating Div.
Cincinnati Gas & Electric Co.



CONVERTING COMPLAINTS INTO DOLLARS

Make "Salesmen" Out of Dissatisfied Customers

... O. M. Bailey, Vice-President
Union Texas Natural Gas Corp.

One of the certainties of the retail LP-Gas business is the recurrence of complaints from dissatisfied customers, resulting in loss of time, prestige and profits. Regardless of how efficient any dealer's operation is, mistakes will be made, and there will be complaints — some justified, some unjustified. The extent to which you profit by these mistakes, however, depends on your own determination to convert complaints into extra sales and additional profits. Perhaps these suggestions will help:

Mistakes don't "just happen," so you must quickly discover the reason or source of the error. You must answer the complaint of the customer of the moment, however, or you may not have another chance at him; but if you handle the matter to his satisfaction, he becomes one of your greatest boosters, and your community is soon aware of it.

The prime requisite of such complaint-handling is, of course, your sincere desire to serve your customers, not merely to sell them — and this philosophy must be reflected by your employees. Your success in turning complaints into sales depends directly on how obviously you want to make whatever adjustments are indicated.

If your complaining customer is unhappy or angry, he is in no mood to be "reasonable," because he's too emotionally involved. So, whether his complaint is justified or not, don't use explanations of reason or logic at the outset. Instead, ask him to tell you just what his complaint is and what he thinks would be a fair adjustment. Reassure him that the incident certainly won't happen again. By thus letting him "empty" himself of his discontent, he is now readier to listen to reason, easier to handle.

Having heard him out, you're also in a better position to judge how much of the responsibility to accept — but whatever the degree, accept it readily and in behalf of your entire organization. Don't blame an employee or even a supplier, deserving as either may be. The customer looks to you for satisfaction. That's why he went to the "top."

If, for instance, the complaint is obviously unreasonable, discuss it with the customer in the area of possible misunderstanding, or a lack of communication at the time the original sale was made. In the majority of cases he probably didn't fully understand what the product or service was designed to perform for him, or your salesman failed to communicate its limitations as well as its potentials.

Complaints are really a chance to be of service to your customers at the very moment when service is most wanted: at the time of dissatisfaction. They present you with an opportunity to consolidate a friendship with him by demonstrating, literally, that his problem is your problem.

Once the complaint is settled, however, don't neglect your follow-through on two important points: be sure the agreed adjustment is made without delay, and take immediate steps to see that the incident doesn't happen again. The importance of communicating the entire incident to your staff is obvious, because if they aren't told specifically of the nature of the complaint, you have no assurance that it won't be repeated.

While there is no guarantee against human error and misunderstanding, there are, nevertheless, three steps you can take to reduce the probability of complaints: first, preserve your faith in human nature; don't be shaken by the exceptions, the malcontents, the chronic-complainers. Second, assure yourself that your sources of supply are the very best you can obtain, for quality and dependability. Third, concentrate on making your organization service-conscious, and the sales will follow.

This philosophy has "paid off" for Union Texas Natural in dealing with our own "public" — our dealers. It's certain to work for you, too.



BPN

PEOPLE

G. DOUGLAS DAVIS from advertising manager of The Bastian-Blessing Co., Chicago, to manager of the new product and market development. RUSSELL E. OWEN, formerly with Day-Brite Lighting, Inc. (St. Louis), is the new advertising manager for B-B.



G. D. Davis



R. E. Owen

Bastian-Blessing

EDGAR A. GAUDETTE, formerly with Johnson & Johnson, recently joined Neptune Meter Co., New York City, as assistant to the president.

ROBERT J. STUART was recently elected vice president in charge of industrial relations of John Wood Co., Conshohocken, Pa.

ELDON E. CARLSON has been named western product manager for Rockwell Manufacturing Co.'s Petroleum & Industrial Meter Division, Pittsburgh. He had previously served as sales engineer in the Houston office.

L. W. "BUD" ROYE—from the sales department of Permaglas Division, A. O. Smith Corp., Kankakee, Ill., to boiler marketing manager.

CORRECTION

H. C. COLLINS was recently appointed general area sales manager for marketing liaison for Tide-water Oil Co. (Los Angeles) with Vangas, Inc., of Fresno, Calif.

The above is in regard to an error published in the April issue of BPN concerning Mr. Collins.



Texgas

UNION TEXAS NATURAL GAS CORPORATION

ENTERPRISE BUILDING

TULSA OKLAHOMA

everyone knows these
two symbols of reliability!
Specify **Robertshaw Unitrols**
and you increase the
saleability and acceptance
of your water heater!



Unitrol has been
installed 21,000,000
times in the field.

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BOILER CONTROLS DIVISION
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ROBERTSHAW-FULTON CONTROLS COMPANY, LTD., TORONTO



DISPOSABLE OR REFILLABLE CONTAINER

- 27¹/₂ dia. x 10¹/₂ overall
- 56.5 cubic in. cylinder
- Water cap 2.03 lbs.
- Propane cap 13.06 oz.
- Working pressure up to 240 psi
- Made to ICC specs. 4B240 ET.

Now a Propane disposable or refillable container with relief and valve fittings adapted for use in the wide market of portable appliances. The industry's most flexible container for stoves, lanterns, torches, etc. Write for additional information today.



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CORPORATION

415-BP6 BRYANT ST. • NORTH TONAWANDA, NEW YORK

People



H. Dodson



W. O. Spencer

Kengas, Inc.

HOWARD DODSON — from district manager of Kengas Inc., Owensboro, Ky., to industrial representative of the Louisville area. W. O. SPENCER has recently been appointed district manager of the Murray area. He was formerly associated with the state fire marshal's office.

RAY C. COMPTON recently joined Caloric Appliance Corp., Cleveland, Ohio, as manager of the firm's Great Lakes sales division. Compton had formerly served with Weller Electric Corp.

WILLIAM D. WIDERMER — from general sales manager of John J. Nesbitt, Inc., Philadelphia, to vice president in charge of sales.

JAMES H. LYON — from senior sales representative of Shippers' Car Line division of ACF Industries, Inc., Chicago, to district sales manager.

DICK MARTIN — from a general engineering capacity at Trinity Steel Co., Inc., Dallas, to general manager of the new transport division.



Dick Martin
Trinity



C. E. Ruelle
Hamilton

C. E. RUELLE — from customer service to sales coordinator for the appliance division of Hamilton Manufacturing Co., Two Rivers, Wis.

E. L. BRUCE was recently appointed sales manager of Johnson-Williams, Inc., of Palo Alto, Calif. The com-

ACCEPTANCE IS A POWERFUL PLUS ...AND WARM MORNING HAS IT!

Products with strong, loyal *customer acceptance* are the easiest to sell . . . and easier sales mean *more sales*, and *more profit*.

WARM MORNING Gas Heaters have this sales-making customer acceptance that is so important to you. Widely known and long associated with fine quality and top performance, **WARM MORNING** is a name people know and *trust*.

Add to those benefits, the sheer beauty, outstanding features and reasonable prices of **WARM MORNING** Gas Heaters and you have the winning combination in space heater sales.

Write for full color literature, and prices — and information about our attractive broadside mailing program and other powerful advertising support for dealers.



Warm Morning GAS HEATERS

LOCKE STOVE COMPANY 114 West 11th St., Kansas City 5, Mo.

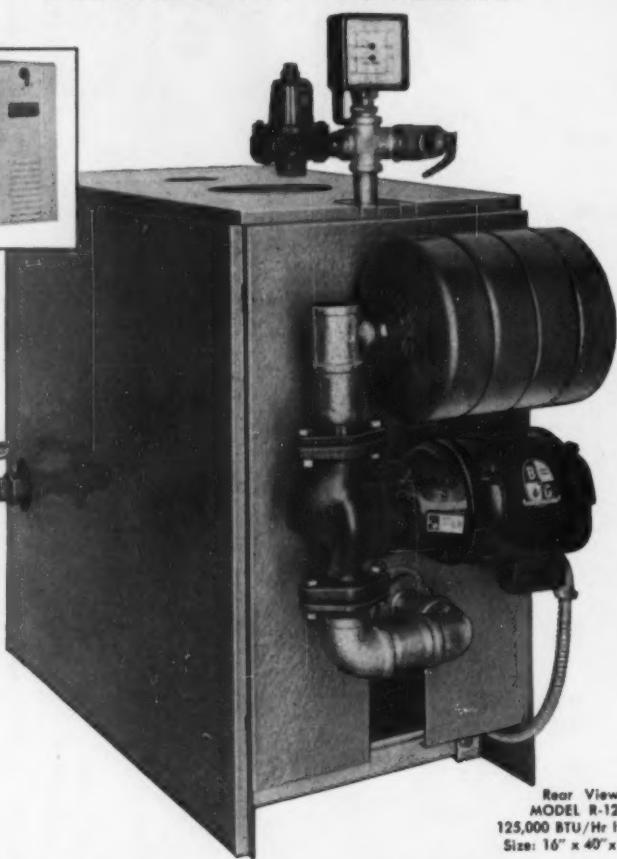
*when the heat's on
...be sure it's*

HYDROTHERM

PACKAGED BOILERS



Front View



Rear View
MODEL R-125
125,000 BTU/Hr Input
Size: 16" x 40" x 28"



Look what you get! Built in expansion tank! Built in M/H power pile! Built in pre-wired circulator! Built in air elimination system! AND . . . all the qualities Hydrotherm is famous for . . . single purpose gas-hydronic design . . . cast-iron construction; horizontal boiler sections with zig-zag water circuit; low fuel consumption; quick heat response! Available in 50,000 to 155,000 BTU/Hr input capacity range. Also available: Packaged Boiler Trim to convert standard Hydrotherm boilers in less than half an hour!

Hydrotherm's complete line of boilers includes capacities from 50,000 to 3,600,000 BTU/Hr input, for domestic, commercial, industrial use.

Write for bulletin #21 and all the facts.

HYDROTHERM

HYDROTHERM, INC., DEPT. 13BP • NORTHVALE, NEW JERSEY

People

pany is a consultant engineering firm and manufactures combustible gas detectors.

C. RANDY GILL recently joined the sales staff of J & S Carburetor Co., Dallas. He was formerly with Valley Industries Inc., Mount Pleasant, Iowa.



C. R. Gill
J & S



J. W. Collins
Grove Valve

JOHN W. COLLINS has recently been named president of Grove Valve and Regulator Co. (Oakland, Calif.), subsidiary of Walworth Co. Collins had been serving as senior vice president.

E. L. UPHAM recently retired from manager of Mobil Oil Co.'s Gas Liquids Division of Crude Oil & Gas Liquids in Dallas. He had served the company for more than 43 years.

W. WAYNE ROBERTS — from staff marketing assistant of the Maytag Co., Newton, Iowa, to regional manager for the southwestern division covering northern Texas.

DUDLEY R. MERRILL, JOSEPH E. LAFEMINA, STANLEY G. URBAN have recently been appointed to the Conservative Gas Division (Long Island area) of National Propane Corp. They will serve as operations manager, controller, and sales manager, consecutively.

WILLIAM M. BURNS—from sales representative to district sales manager in Houston.



DEATHS

HERMAN MERKER, 63, chairman of the board of Pressed Steel Tank Co., Milwaukee, Wis., died unexpectedly of a heart attack on March 14. He was long active in the affairs of the LPGA and the Compressed Gas Association.

OUR GUIDING LIGHT -

Your Customer's Pilot.....

IN THE YEARS AHEAD
AS IN THE 20 PAST



YOU CAN COUNT ON ANCHOR...

Anchor plants are new, employing the latest techniques of refining, storage, and transport. Therefore, Anchorgas is of the highest quality.

Anchor's offices, facilities and service are nation-wide. There is an Anchor man near you who is skilled in the LPG business. He is ready to offer you personal, local help. To get in touch with him fast, call Tulsa, LUther 2-7261.



ANCHOR PETROLEUM DIVISION
Mobil Oil Company
TULSA, OKLAHOMA



management portfolio

What records should you keep for tax purposes?

COUNSEL
AT YOUR
ELBOW

Businessmen — in fact, all taxpayers — must preserve certain records to substantiate their tax returns. Which records to keep, and how long to keep them, are matters about which some confusion exists because of the complexity of the laws.

This guide to help you find your way through the maze of regulations on the subject was prepared by BPN's tax expert, E. H. Mitchell.

WHY ARE PRESERVED RECORDS SO ESSENTIAL?

It has long been conceded that records are a necessary element of a successful business. But, since the advent of the income tax, we have had three other answers to the above question. All three are pertinent whether one is in business or not.

First: Every taxpayer is required to keep records. The law requires every taxpayer to maintain records from which he can prepare "complete and accurate income tax returns."

Second: Without records, the preparation of an accurate return is next to impossible. Even the most experienced tax accountant cannot prepare an accurate income tax return.

Third: Records are your most potent weapons in disputes with the Internal Revenue Service. If, by mistake, you overpay your tax and seek to recover the excess, or the Service mistakenly asserts a deficiency on the basis of underpayment, the burden of proof — in either case is on you. A deficiency assessment is *prima facie* correct. A revenue agent is rarely impressed by a taxpayer's memory. He resolves all doubts in favor of the government. As a rule, it takes adequate documentary evidence, carefully preserved, to dispel them.

Such records (formal or informal) should clearly establish the date and amount of all income received, deductions, credits, and all other items required to be shown in a return.

How long should records be kept?

Retain all such records just as long as their possible usefulness exists. In other words, preserve them until *after the statute of limitations has barred* (1) any tax deficiency assessment by the government against you, and (2) any claim by you for a refund.

Here are the most important statutory periods:

1. A *three year* period after the return was filed (or was due) is given the government within which to assess a tax deficiency or

to sue to collect without an assessment. As a precaution, it might be well to retain your supporting records an additional year. If the period is extended by formal written agreement, such agreement is binding on both parties.

If a return is not filed or if a filed return is knowingly false, there is no limitation on the time within which the government can assess or force collection by suit.

2. A *six year* period after a return was filed is allowed the government within which to assess, or collect by suit, where more than 25 per cent of the *reported* gross income was omitted from the return.

3. A *six year* period (after a timely assessment) is allowed the government within which to collect by distraint or a proceeding in court, or prior to the end of a period *extended* by written agreement.

4. A *two year* period (after it pays an erroneous tax refund) is given the government within which to sue for its recovery. But if the refund was induced by fraud, it has five years after payment within which to sue for recovery.

Where a taxpayer sells or otherwise transfers property after a tax assessment against him, but before its payment by him, the buyer or transferee, by operation of law, becomes personally liable for the tax to the extent of the value of the property transferred. In such event —

5. *One additional year* (after the end of the period for assessment against the original taxpayer) is given the government to assess the tax against (or collect it from) the transferee. If you happen to be the transferee of a transferee, an *additional year or two* is added to the government's time to take action against you. In such event consult your tax attorney.

Your records relating to social security, withholding and unemployment insurance taxes should be kept available for a period of at least

6. *Four years* after the date the tax to which it relates becomes due, or the tax is paid, whichever is the later." As a precaution, an

additional year is recommended. 7. *Three years* from the due date of any tax return, or *two years* from which the time the tax is paid (whichever expires later), is allowed *you within* which you may file a claim for refund or credit of an overpayment.

8. *Seven years* is the period allowed if your claim relates to the deductibility of bad debts or worthless securities.

9. *Ten years* is the period if your claim relates to a credit for foreign taxes.

10. *Two years* from the time the commissioner sends you (by registered mail) a notice of disallowance of your claim, is given you within which you may commence suit based on such a rejected claim.

11. Records of transactions relating to the basis of property should be preserved as long as they are material in determining the basis of the original or replacement property.

12. Some records should be retained *indefinitely*. Consult your tax adviser.

Tax returns

It is recommended the following be preserved for at least *four years*: copies of filed income tax and other returns, of attached schedules, of summaries, and of all other working notes and computations. Should they come within any of the situations described where the period exceeds four years, they should be kept for a longer period. You will find them of great help in the preparation of future tax returns.

In conclusion it must be pointed out that basic documents such as deeds, bills of sale, mortgages, etc., should be kept *permanently*, as should formal books of account and stock books, plus all documentary evidence of patents, copyrights, franchises and the like.

Subject to the above limitations, records that have definitely served their purpose and are positively dead should be destroyed. If you are engaged in business, this can reduce space and labor expenses, as well as fire hazards. ■



any time...
anywhere...
any weather...



BE SURE
OF SERVICE

WITH

PURE

No other supplier can give you more sure benefits. What's more, you can count on these benefits *always* —no matter what the time or weather:

- You buy direct from PURE, producer of its own LP-Gas.
- You buy a product of rigidly controlled quality.
- You get delivery when you need it—no delays—by PURE's own fleet of tank cars and by trucks.
- You are sure of constant supply from PURE's huge underground storage facilities and ever-increasing production.
- You sell under your own brand name, without competition from PURE.

For all the money-making facts, call or write the Pure Oil office nearest you. Do it now—and be *sure* from now on!

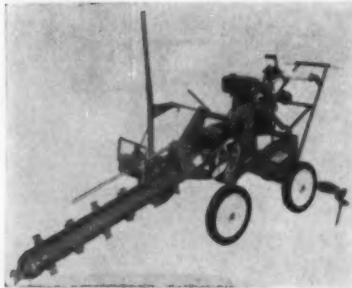
The Pure Oil Company, 200 East Golf Road, Palatine, Illinois • Minneapolis, Minnesota: 825 Thornton Street, SE • Fort Worth, Texas: Fair Building, P. O. Box 2107 • Tampa, Florida: P. O. Box 1630.



Be sure with Pure

For further information on any items in this section use the convenient Univac Readers' Service postcards on pages 69, 70.

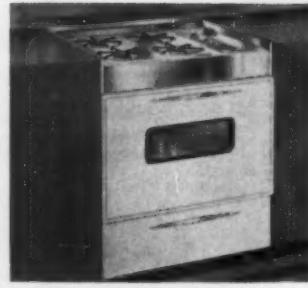
New Products and Free Literature



Light-weight portable trencher introduced

Circle 1 on Readers' Service Card

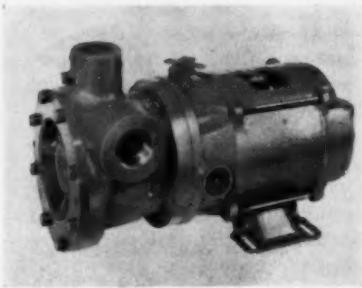
A new light-weight portable trencher (GEC 210) is now being marketed. The unit weighs 345 lbs and will dig a trench three inches wide with a depth of 32 in. It has a four horse-power cast iron engine with oil bath air cleaner and a mechanical flyball governor. Overall length is 57 in., height—35 in., width—29 in. Wind-King Mfg. Co.



Free-standing range uses only 30 inches of space

Circle 3 on Readers' Service Card

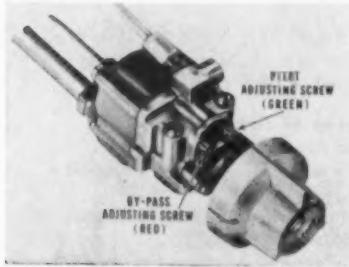
"Simplicity," a free-standing range (GEC 240) with the appearance of a built-in occupies only 30 in. of space. It features a tank-type oven with an "eze-out" bottom that is completely removable for soak cleaning. The stove is available with either flash-tube ignition burners or thermal eye burners. Brown Stove Works.



Pumps have new type fan cooled motors

Circle 5 on Readers' Service Card

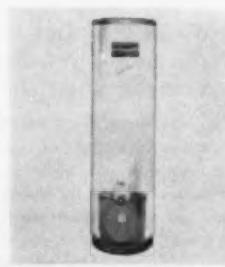
A new pump (GEC 660) is now equipped with new type fan-cooled motors for continuous duty. The motor is fitted with drain plugs to automatically remove troublesome accumulated moisture. Motors are maintenance-free, with no brushes to wear out. The smallest of the series easily maintains 85 psi differential. Corkens, Inc.



Color-coding simplifies thermostatic adjustment

Circle 2 on Readers' Service Card

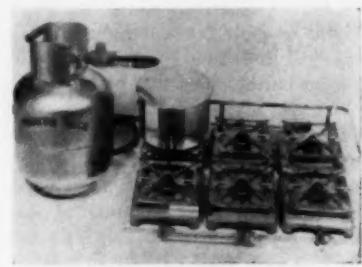
A new color-coding device has been designed to help speed proper adjustment and servicing when a gas range is being installed in the consumer's home. The by-pass adjustment screws are colored red on all oven thermostats, and pilot adjustment screws are green (GEC 190). Harper-Wyman.



Automatic gas water heater has 10-year guarantee

Circle 4 on Readers' Service Card

This glass-lined automatic gas water heater provides the buyer for the first time with a 10-year full value guarantee. Construction process perfects the fusion of glass to steel. The heater (GEC 860) comes in 30-, 40-, and 50-gal sizes, and operates at input ratings of 30,000 to 50,000 Btu. A. O. Smith.



Portable LPG burners for indoors and outdoors

Circle 6 on Readers' Service Card

A portable propane cooking heating "package" called "Pronto Pack," has been devised for outdoors and indoors as well. The burners are plated with heavy porcelain. A heavy cast aluminum grid acts as a conductor for even heat (GEC 240). Thompson Distributing Co.

METERED LP-GAS SERVICE REDUCES COSTS—BUILDS SALES FOR FUELANE

By providing metered LP-Gas service to more than 200,000 Happy Cooking consumers, Fuelane Corporation, Liberty, New York, is building more sales volume than ever before from Maine to Maryland. This "city-type" method of accurately measuring LP-Gas gives increased customer confidence, and for Fuelane it reduces expensive cross-hauling, out-of-gas calls, and accounts receivable. The many advantages of metered service make it one of Fuelane's most effective operating tools. Fuelane uses American Meter Company's WC-45-LPG Welded Steelcase Meters.



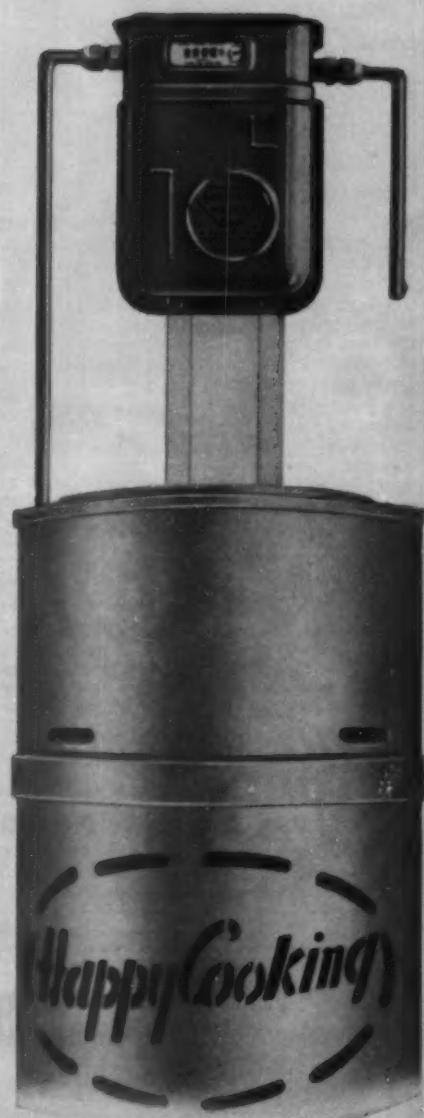
Time-tested features pioneered by American®, plus many refinements in design, are incorporated in the WC-45-LPG Meter to make it ideal for average domestic loads. It has an internal, counter-type index protected by a clear plastic cover, Duramic diaphragms and oil impregnated porous bronze bearings. Rated capacity is 45 cfm propane, 40 cfm butane at $\frac{1}{2}$ -inch w.c. differential, with 5 psi working pressure. For full information write for Bulletin 316.

AMERICAN®
METER COMPANY
INCORPORATED 1886 - EXCELSIOR 1890

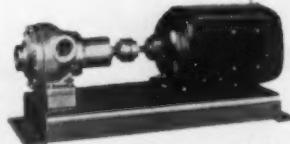
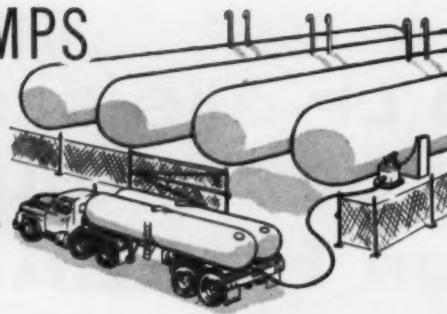


GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany
Atlanta • Baltimore • Birmingham • Boston • Chicago • Dallas
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Tulsa • Wynnewood

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Calgary • Edmonton • Montreal • Regina • Vancouver



SMITH PUMPS for BULK FUEL TRANSFER



Model MC 1044



Model MC-2

MODEL MC 1044 15-20 GPM at 1800 RPM
Ideal for filling small containers and motor vehicle tanks. Use with 1½ or 2 hp motor and 1½" piping inlet.

MODEL MC 1044H 20-35 GPM at 1800 RPM
For small bulk plants. Excellent for filling motor fuel tanks and cylinders. Loads delivery trucks at 35 gpm with vapor return line, 2" inlet pipe.

MODEL MC-2 30-50 GPM at 1800 RPM
Bulk plant pump unloads at 50 gpm. Loads at 40 gpm; 30 gpm with meter. Use with 3 or 5 hp motor and 2" or 2½" piping inlet. Steel flanges if desired.

MODEL MC-2Q 27½-50 GPM at 1800 RPM
Herringbone gears assure quiet operation. Use with 3, 5 or 7½ hp motors, 2 or 2½" inlet pipe.

MODEL MC-3 To 100 GPM at 1800 RPM
For volume loading and unloading truck transports, railroad tank cars, etc. 3" piping inlet. 5 or 7½ hp motors.

MODEL MC-4 To 150 GPM at 1800 RPM
For large capacity filling and unloading at large bulk storage terminals. 4" inlet piping. 7½ or 10 hp motors.

MODEL MC-5 To 200 GPM at 1800 RPM
Special pump for extra large capacity. Write for specifications.

MODEL ATC 30-50 GPM at 1800 RPM
For either truck or bulk plant installation. Flanges are standard equipment. For 2" or 2½" piping inlet, threaded or welded.

New products



New gas bathroom heater combines all qualities

Circle 7 on Readers' Service Card

This new gas bathroom heater (GEC 420) combines all of the necessary proven qualities in a chrome housing of reduced size. It can be installed in half-baths as small as 4 x 4½ ft. Peerless Mfg.



40/40 vaporizer designed for small industries

Circle 8 on Readers' Service Card

This LPG model 40/40 vaporizer has a rated capacity of 40 gals per hour. Designed for smaller industries, it features double protection against liquid carry over (GEC 830). ALGAS Corp.



LPG filter and solenoid valve combine filterlock

Circle 9 on Readers' Service Card

A new filterlock operates in any position, eliminating extra fittings. A combination LPG filter and solenoid valve, it is 20 per cent lighter than separate components (GEC 820). Beam Products Mfg.

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Developments Each Month**

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198 SOUTH ALVARADO STREET, LOS ANGELES 57, CALIFORNIA

Check herewith Bill me 1 year \$2.00 2 years \$3.00

Name Title

Firm

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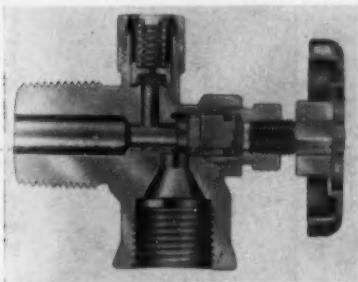
City Zone State



**New console models
available in two series**

Circle 10 on Readers' Service Card

Six new "Brilliant Fire" console model heaters come in two distinct series. Sizes are 35,000, 50,000 or 65,000 Btu. A one-piece cast-iron burner eliminates "clogging" and maintains even gas flow for uniform flame (GEC 420). Ohio Foundry.



**Compact LPG cylinder
valve designed**

Circle 11 on Readers' Service Card

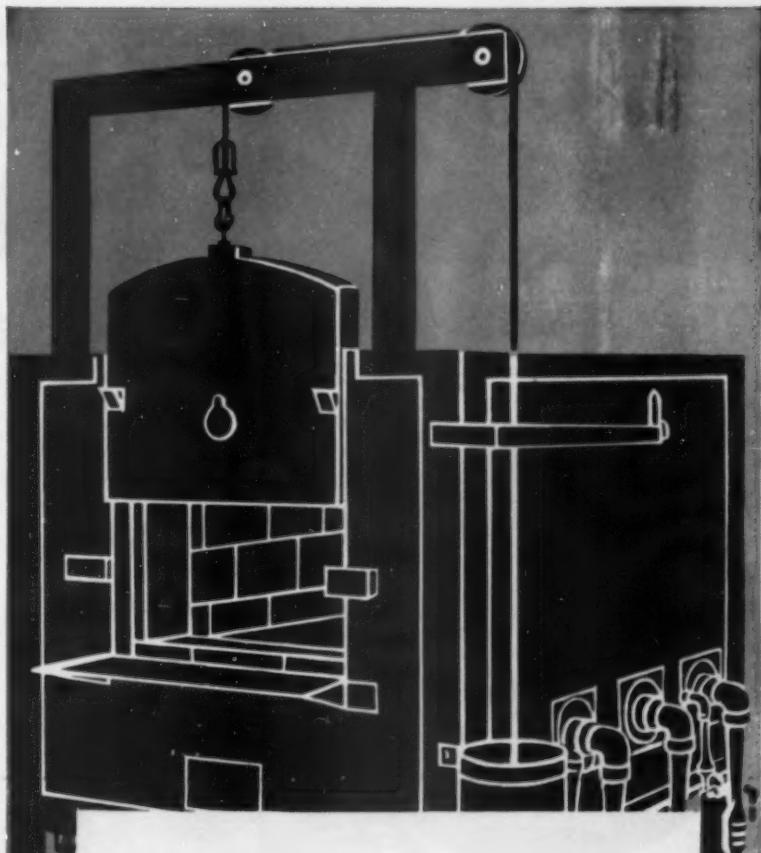
A new compact LPG cylinder valve has been designed for use where size and weight are of major importance. Safety relief is set to relieve at 375 psi (GEC 820). Sherwood Valve.



**Meter measures needs for
both heating and hot water**

Circle 12 on Readers' Service Card

A new fuel demand meter that measures requirements for both heating and hot water needs has been developed. Two electronic tabulators provide the information for heat and hot water (GEC 540). Johnson Degree Day.



**Time-tested equipment . . .
plus progressive engineering . . . to meet
your heat-treating requirements**

Progressive things are happening at Hones to bring together the experience of years in industrial heating equipment and the forward-looking concepts of modern engineering skills. The time-tested "Buzzer" line needs no blowers, power or other auxiliary equipment to effect combustion; simply connects to the available gas supply.

CHARLES A.
HONES INC.

133 S. Grand Ave., Baldwin, L.I., N.Y.

Files Up
To Date?
Get The
New Hones
Catalog



**MANUFACTURERS OF "BUZZER" EQUIPMENT FOR
HEAT TREATING - MELTING - SOLDERING . . . SINCE 1911**

SAVE TIME and MONEY with

VIKING'S LP-GAS PUMPS

Big Capacity Truck Pumps

80 G.P.M. at
700 R.P.M.



Fig. 260
Truck Mounting

Double the pumping capacity of your tank truck with the NEW Viking KK250U, installed with sufficiently large inlet lines and fittings.

Fig. FH-696
Fueling Pump

Built to fit every fueling and bottle filling need, these Vikings are direct connected. Available in capacities of 5, 10, 20 and 30 G.P.M., operating from 3450 R.P.M. to 1750 R.P.M.

Complete Line of Bottle Filling and Fueling Pumps



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Pipe sealer available in plastic squeeze bottles

Circle 14 on Readers' Service Card

This pipe sealer is now available in a handy plastic squeeze bottle (GEC 730). The sealer is insoluble in refrigerants, LPG, gasoline and oils. Madden Brass Products.



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Circle 15 on Readers' Service Card

A compact, high pressure solenoid valve has been developed for use in liquid and gas control. The unit (GEC 820) will serve under pressures up to 200 psi in 65 to 350 deg temperatures. General Magnetics.

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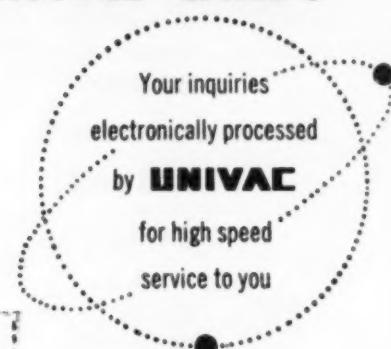
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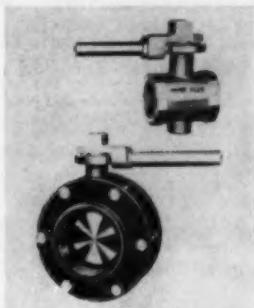
New products



New "Pow-R-Ditcher" has all-hydraulic ground travel

Circle 16 on Readers' Service Card

The new dumper (GEC 210) features all-hydraulic ground travel, regardless of digging speeds or transport speeds. The new unit digs up to eight inches wide and is the smallest in the company's line. Vemeer Manufacturing.



Butterfly valves rated at 150 lbs water pressure

Circle 17 on Readers' Service Card

The new butterfly valves, rated at 150 lbs water pressure, cover a pipe size range from 2 to 18 in. They have nickel-plated cast iron or cast steel bodies with stainless steel trim (GEC 820). The compactness and light-weight of these valves eliminate the need for additional line bracing. Lunkenheimer Co.

"Thermoramic Center" offers indoor weather data, control

Circle 18 on Readers' Service Card

A "Thermoramic Center" which offers indoor weather data and control, as well as information on outdoor atmospheric conditions, is now available. It features a monitor system which indicates clogged air-conditioning filters, an extinguished gas pilot light, or an improperly functioning compressor (GEC 190). General Controls.



• AUTOMATIC CONTROLS

Equipped with factory installed and connected "Basotron" combination Safety Valve and Thermostat . . . with the Thermostat Knob conveniently accessible.

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Truly outstanding in both design and performance . . . plus the added sales appeal of downright economy. Supplies radiant heat floorward instantly, followed immediately by circulated heat flow into the living zone. The cozy "Fire Light" flame is visible through the grill and protected by Pyrex Safety Glass paneling.

Other plus features include: built-in lint-proof Pilot . . . all-weather Draft Diverter . . . castiron Burner for top production on minimum fuel . . . built-in Floor Pan and rear paneling safeguard adjacent furnishings and finishes . . . rugged well-balanced cabinet modestly elevated on sturdy legs—permits air circulation.

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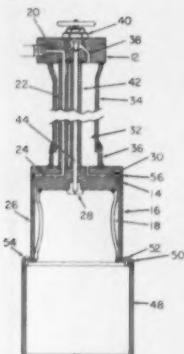
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Burner maintains swirling flame action

Circle 19 on Readers' Service Card

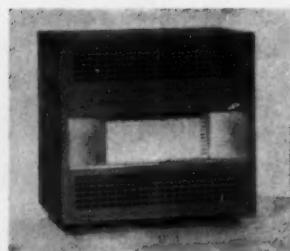
Tar-kettle burner (GEC 780) has modified inside walls to swirl the flame. The valve nearest the torch prevents gas from remaining in the line after cut-off. LPG enters at 20, goes into the block at 26, where it is vaporized by the heat exchange caused by the flame at the orifice (28). Vaporized gas then comes out through 30, up through 38—controlled by an adjustment valve (40)—down through 44 to the orifice, where it is burned. Delaware Valley Propane Co.



Single valve regulator gives 2-stage performance

Circle 20 on Readers' Service Card

A new series of regulators gives the performance of a two stage regulator with the simplicity and economy of a single valve. Output pressures are not affected by varying inlet pressures (GEC 700). Kim Products.



multiple heat exchangers, affording a high degree of circulation and warm air volume (GEC 420). Dearborn Stove.

FREE LITERATURE

Lift trucks described

Circle 22 on Readers' Service Card

A line of lift trucks with capacity ranges of 2000 to 10,000 lbs is described in a new 16-page catalog (GEC 485). The LPG "power-crater" engine has been proved to operate successfully for 350 million hours. Allis-Chalmers.

Gas-fired heater detailed

Circle 23 on Readers' Service Card

Designed for a special appeal to the economy market, a new vented gas area heater has just been introduced. The 12 models, from 35-65,000 Btu, have both standard and optional equipment. The combustion chamber is composed of mul-

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EXCLUSIVE "Built-in"
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**Other features:**

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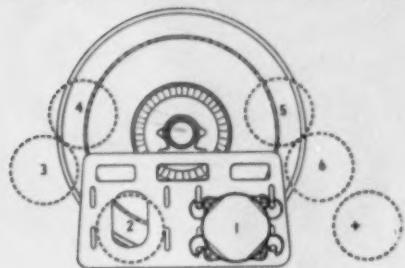
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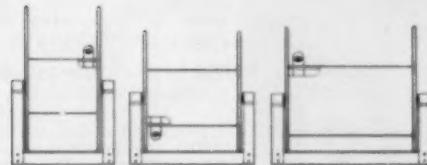
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EACH OF THESE REELS WILL HOLD THE SAME AMOUNT OF A GIVEN SIZE HOSE

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MANY DEALERS USE SEPARATE REELS FOR PRODUCT AND VAPOR HOSE LINES

The use of separate reels to handle product and vapor return lines is especially practical when extreme hose length makes dual hose handling difficult, or when the vapor line is not used for every delivery. For vapor hose lengths of 100 feet or less, reels with spring rewind motors prove efficient and economical. Longer hose requires the power provided by explosion-proof electric or hydraulic rewind motors.

Ask your Truck Builder or LP-Gas Equipment Dealer for the pocket-size guide to "Efficient Hose Handling for LP-Gas Delivery," or send your request directly to Hannay.



CLIFFORD B. HANNAY & SON, INC.
WESTERLO, NEW YORK



The Rex Bests, Sr., and Jr., have worked together since the son joined the firm eight years ago. That Trophy on the desk was presented by the governor in 1959, the year Best was named the state's outstanding handicapped person.

Mr. Best of Stantonburg

THERE PROBABLY HASN'T BEEN A TIME FOR MANY YEARS WHEN REX BEST, the Esso distributor in Stantonburg, N. C., hasn't been involved in some local project. School problems, church problems, bank

problems, the Kiwanis Club, getting the Boy Scouts started, a scrap metal drive, and charitable fund raising have all been in the able hands of this man who has spent most of his life in a wheel chair.

A victim of rheumatoid arthritis since 1910, when he was ten, Best is paralyzed from his waist to his feet and can move his head only a few inches to either side. Yet he has built a thriving business from scratch and is the leading petroleum products distributor in his area.

Watching him deftly and effortlessly maneuver his well-worn wheel chair about his office, a visitor can almost forget his handicap. He gets around his marketing area just as well, driving his car with the aid of a rig he devised (back in 1920) out of a barn door hinge, pipe, and the end of a steering rod. And, he gets around the nation just as well, attending banking and Kiwanis conventions all over the country.

But Best's early life was hard. There were years of unimaginable pain. At 16, he learned that he would never walk again. His illness forced him to drop out of school, but he studied at home. After completing a course in book-keeping, he wheeled his chair down to a local automobile dealer, and when the man doubted he could handle the job, he went to work for nothing to prove that he could.

Two years later, young Best had saved enough to open his own retail oil business. Patrons helped themselves to kerosene for cooking and light—and more and more, as time went on—to gasoline and oil for automobiles. Though they pumped their own gas and filled their own cans, Best was always there to make change, to offer a cheery word, and to make sure no one went away without everything he needed. By 1923, he was handling 75 per cent of the oil business in town. It was in that year that Jersey Standard invited him to lease and operate the wholesale bulk plant it was building in Stantonburg.

A tree-shaded town of 888 people, Stantonburg sits on flat land in the midst of some of North Carolina's richest tobacco country. Today, Best's territory extends far beyond the town into three counties. He supplies thirty retail oil dealers and 300 farms. Five trucks make oil and gasoline deliveries, two

This Portable Trencher OUTWORKS a dozen good men with spades



TIME SAVING
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- ★ Weighs only 245 pounds
- ★ Welded steel boom elevates to vertical
- ★ Measures 29" wide, 35" high, 57" long with boom up
- ★ Heavy-duty 4 h.p. engine
- ★ Efficient portable design
- ★ Trenches up to 10 feet per minute



Here, at last, is the modern, practical solution to your trenching problems. The little but mighty DIGZ-ALL Trencher is a portable machine that quickly, neatly and economically "opens up the earth" to a depth of 32 inches for the laying of wires, cables or pipes and many other jobs. It's a one-man operation that saves time and money and practically eliminates "digging-up-the-yard" complaints. Cost of the DIGZ-ALL Trencher is far less than you'd expect. Maintenance and operating costs are also exceptionally low. The DIGZ-ALL Trencher is a "natural" and a "must" for any company that does trenching.

For additional information write to:

WIND-KING MANUFACTURING CO. MERRILL, IOWA

Much of this material originally appeared in "The Lamp," a Standard Oil Co. publication.

others carry Essotane cylinder gas to nearly 600 customers.

Best got into the LPG business in 1936 with one small pickup. All of the LPG was hauled more than 150 miles on that pickup from Salisbury, the only place it could be obtained. Originally, there were only about one dozen customers for bottled gas, but the load grew steadily. By 1948, it had grown to such an extent that Best put his brother, Lee, in charge of that operation. That's the way the situation remains today, with Lee Best managing the Essotane Dep't.

"Do not think, however, that Dad has turned the operation over to anyone entirely," says Rex Best, Jr. "He keeps in constant touch with all departments and always has."

Young Best adds that "quite a few" farmers in the area are beginning to use LPG for tobacco curing. Last year, this load "grew by leaps and bounds." One result is that the two-man LPG department now requires additional summer help. Another is that the Bests have just completed a bulk plant in Stantonsburg and will no longer have to haul product from the Esso plant in Rocky Mount.

Gradually, Best is turning over some of his business to Rex Jr., one of three children. But the elder Best still maintains regular hours, for the business is still growing and he is proud of it. He once had an opportunity to operate a bulk plant in a larger town, but said he would take it only if the plant could be moved to Stantonsburg. This love of his town is the reason why Best does so much civic work.

"I want to try to pay back the people here for being so good to me," he explains.

Certainly, the people of Stantonsburg have made life easier and more pleasant for their Mr. Best. Wherever he goes, three or four men are always at hand to carry him and his chair, if necessary. One seat in the school auditorium was removed to make room for his chair and a special space is reserved for it in church. Curbs near his home and office have been cut through so he can cross the street without help.

While they do make his life physically less difficult, Best's

friends, in speaking of him don't seem to even think of him as being handicapped.

Says the bank president:

"He's a person it is good to be around. And, along with all his fine human qualities, he's a solid businessman."

Says the school superintendent (Best conceived and put through a school reorganization plan that saved the townspeople \$1 million):

"He manages the school finances as smartly as he does his Esso busi-

ness. And he knows how to get people to do things. He's a natural born leader."

And a church trustee:

"Rex will work hard at anything for the community. He gets elected for his ability and the fact that he works about twice as hard as most people."

And what does shy, reserved Rex Best have to say about such tributes?

"I wouldn't trade places with anyone in this world." ■

DOLLAR-WISE Dearborn

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NEW SEALED-FLOW Vented Gas Area Heater

- HERMETICALLY SEALED COMBUSTION CHAMBER... uses one hole in outside wall for air intake and venting.
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Available in Three Sizes:
10,000, 25,000 and 35,000 BTU'S



DOLLARWISE it's the
CREST Unvented Gas Area Heater

- COOL SAFETY CABINET
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- Concealed but convenient CONTROLS

Available in Five Sizes:
39,950, 35,000 25,000,
20,000 and 12,000 BTU'S



DOLLARWISE it's the
CLIP-ON Unvented Wall Heater

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CHARLOTTE, N. C.

BPN
ASSOCIATIONS

LPGA elects Williams president: producer, supplier named to offices

The election of E. O. N. Williams as president and the making of association history highlighted the 30th annual convention of the Liquefied Petroleum Gas Association held in Chicago in early May. Williams, president of the Bottled Gas Corp. of Virginia, was unanimously elected to the association's highest office by vote of the Board of Directors.

Also elected by similar votes and without opposition were W. A. Schuette, Petrolane Hausgas, Washington, Mo., as first vice president; Arthur Kruetzer, secretary, and Norman A. Evans, Pressed Steel Tank, Milwaukee, Wis., treasurer.

But, the precedent-shattering event of the board meeting was the nomination and election of a representative of the producer companies as second vice president. John Storm, who heads up the LPG sales for Sinclair Oil & Gas Co., was the man who broke the unwritten law which heretofore had limited the holding of such high association office exclusively to marketers.

W. S. Brenckle, National LP-gas Corp., and T. E. Ennett, Rockford Propane Co., were the others nominated for the association's third highest elected office. However, an impassioned plea by H. Emerson Thomas went a long way toward deciding the outcome.

Thomas told the voters that they should be thinking of the association's good "and not of individuals at this time. No one in the producing end of the business has ever had the opportunity to become president of our association. We must adopt a policy now that a producer can and should be considered. With the future of the association in mind," he concluded, "I nominate John Storm as second vice president."

Following the announcement of the voting outcome of this only contested spot on the ballot, Ennett moved for a unanimous vote, which was accepted. Brenckle was later elected as the marketers' repre-

sentative to the association's planning board.

The 1961 Distinguished Service Membership & Sely Award went to Lee A. Brand, first vice president of the Empire Stove Co. Brand was cited for his contributions to the gas industry during his 41 years of service. A check for \$1000 also went with the awards.

Among others who were honored during the course of the four-day convention which attracted an estimated 3500 dealers, manufacturers and producers was Heatflame, Inc., which received the H. Emerson Thomas safety award.



E. O. N. Williams

The theme of the convention—Spotlight on Potential—was noted by Frank M. Porter, president of the American Petroleum Institute, in his keynoting address. That spotlight was also on the head table during Porter's speech as top brass from at least a half dozen major petroleum products producers were in attendance.

After Porter's remarks, R. J. Munzer, outgoing president of the association and president of Petrolane Gas Service, Inc., delivered a report of the year's progress. He noted that the "LPG industry is changing—it is growing up." Evidence of this was, in addition to the aforementioned head table guests, he said, that "investors of this country have taken great interest in this industry."

Munzer then went on to note the progress in gas-united programs,

which are needed on all fronts and are essential to the future growth of the industry. Skipping to the proposed affiliation of the association with the National LP-gas Council, Munzer noted that the activities of both groups should be coordinated.

As one example of the need, he said: "It seems unfortunate to me that a great convention, of a great industry such as we are having here at the present time, lacks a well developed and experienced public relations arm."

Among the other speeches heard by the convention delegates were those presented by Alfred P. Dodge, "LP-gas Specifications," C. P. Keeley, Pyrofax Gas Corp.; and "Why Be Afraid to Sell?" by R. Stuart Steele, Steele Rulane Service, Inc. The convention closed out with its annual banquet, entitled: "The Gas Flame Gaieties." ■

Western Liquid Gas elects Usher, Legg, Drew

Taking over as the new president of the Western Liquid Gas Association, following his election at the annual convention in Sacramento in April, C. Roland Usher painted an optimistic picture of the industry's future in the West.



Roland Usher

"LPG is the only fuel that will power a complete, self-sustained system for all equipment and appliances necessary to a modern-day ranch operation at practical cost," he said.

Usher also stated that California has become the fourth largest consuming state of LPG and may soon overtake Illinois to move into third place. The use of LPG in California during 1960 was nearly five per cent of the national total and consumption grew from 228 million gals. in 1950 to approximately 425 million gals. in 1960—nearly a 100 per cent increase.

Other officers elected for the year include: Brad Legg of Glenbrook Gas Co., Grass Valley, Calif., vice-

president; secretary-treasurer, Elmer J. Drew of Rockgas Service Co., El Cajon, Calif.; and managing director, Everett B. Murphy.

More than 600 attended the convention and viewed 55 exhibits, including one outside exhibit of transports and delivery trucks.

GAMA divisions elect delegates and officers

Delegates to product divisions of Gas Appliance Manufacturers Association elected officers and members during its 26th annual meeting held recently in Boca Raton, Fla.

Divisions and chairmen are: automatic controls—R. A. Sherer, White-Rodgers, St. Louis; automatic gas disposer—LeRoy Klein, Caloric Appliance Corp., Wyncote, Pa.; direct heating equipment—Robert H. Norris, Dearborn Stove Co., Dallas; domestic gas range—S. B. Rymer, Magic Chef, Inc., Cleveland, Tenn.; gas appliance regulator—Charles Stang Jr., Maxitrol Co., Detroit; gas boiler—Gordon L. Cheasley, Rheem Manufacturing Co., New Castle, Del.; gas clothes dryer—Edward A. Nash, Norge Sales Corp., Chicago; gas conversion burner—Joseph F. Capoun, Columbia Burner Co., Toledo; gas furnace division—Samuel F. Shawhan, Bryant Manufacturing Co., Indianapolis; gas unit heater and duct furnace—Clarence E. Scott, Sterlairco, Inc., Westfield, Mass.; gas valve—Donald E. Du Perow, Lincoln Brass Works, Inc., Detroit; gas vent and chimney—John H. Schmidt, Van-Packer Co., Carbon Cliff, Ill.; gas wall and floor furnace—Lee Brand, Empire Stove, Belleville, Ill.; gas water heater—Charles Callanan Jr., American Radiator and Standard Sanitary Corp., New York City; relief valve—Nils Swanson, McDonnell and Miller, Chicago; industrial gas equipment—Lowell Crouse, Maxon Premix Burner Co., Muncie, Ind.; gas refrigerator—George Stevens, Whirlpool Corp., Benton Harbor, Mich.

ASSOCIATION NOTES

Walter R. Christopherson of Spencer was elected president of the Iowa LPGA at its recent convention. Harlan Williams of Des Moines was named vice-president and W. B. Jenkins of Early was re-elected secretary-treasurer.

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Gene's Jet— a minor revolution in propane utilization?

Here's a behind-the-throttle report by Managing Editor Robert Clay on a unique, exciting development—a small, light, inexpensive jet engine that runs only on propane. It could affect your future in five different ways.

IT WAS A SUNNY, LATE-WINTER, SOUTHERN CALIFORNIA DAY and the scene was a railroad siding separating a small new industrial area from San Fernando Valley's Van Nuys Airport, where Air National Guard jets thunder in and out and swarms of private planes flit about.

Before us stood a strange-looking gadget, a dial-, switch-, knob-covered aluminum panel mounted on a tubular stand. Pivot-mounted on the same stand was a gadget-cluttered metal arm leading to a streamlined, somewhat swollen, blackened 3-ft-long "stove pipe" suspended parallel to the ground.

"Be my guest!" said the short, forty-ish sandy-haired man.

At his direction, we flipped a switch and turned a valve wheel. The stove pipe became alive with a roar that probably brought out the bugs from under nearby rocks and certainly brought out the tenants from near-by buildings, even though they are accustomed to the roar of jet fighters. In seconds, the stove pipe was glowing red hot and it could only be taken for what it

was—a jet engine. We had been introduced to Gene's Jet, formally called the Gluhareff G8-2 Pressure Jet Engine.

And let us say right now: Eugene M. Gluhareff has a completely unique, most extraordinary jet engine. Not only does it have an amazing output for its extremely light weight and a low price tag; but it is designed to run on one and only one fuel, propane.

At Gluhareff's urging, we opened the valve further, increasing the supply of propane and sending the roar up to a high pitch. Then we got in front of the engine and pushed against the pivoted supporting arm with a pole to feel the thrust of the jet. Next, we positioned ourselves a respectful distance behind the G8-2 to feel the hot exhaust stream. Finally, we went back to the control panel, turned the valve wheel, and silence was suddenly restored.

As the hastily-formed semi-circle of spectators broke up, they were obviously impressed. And so were we. While we were impressed by the roar and the red-hot stainless steel, we were even more impressed by movies Gene showed us of the engine powering strap-on-your-back helicopters and flying platforms; and by the commercial possibilities he outlined for the engine's adaptation for frost protection devices. But what possibly impressed us the most were two facts:

1. This "fantastic" (that's an independent expert's appraisal, not ours) engine is designed specifically to take advantage of propane's unique properties and it must have many as-yet-unpredicted possibilities.

2. Gluhareff is undoubtedly one of propane's most enthusiastic proponents.

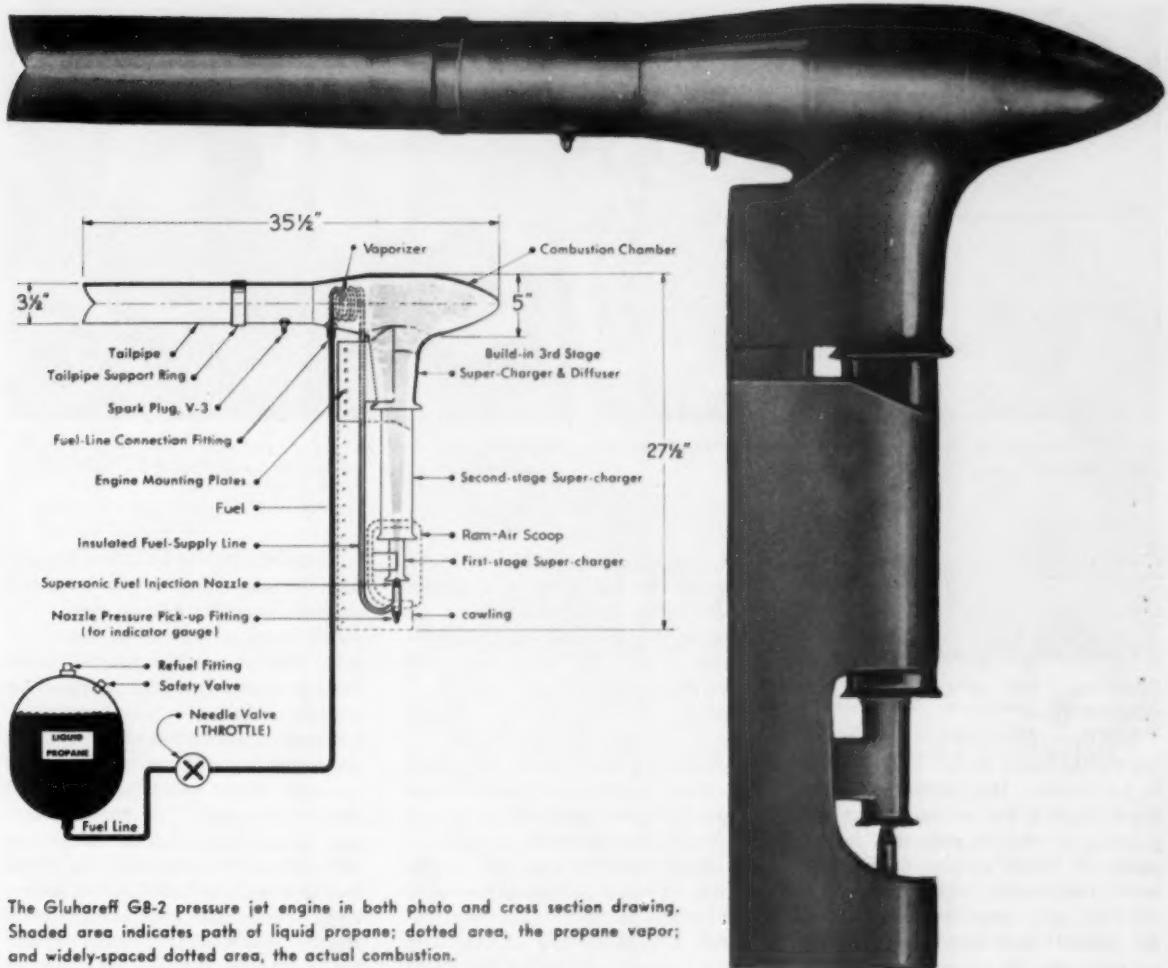
To put that second point in its proper perspective, let's look at the qualifications of the president of Gluhareff Helicopters, which is virtually a one-man company.

A graduate of Rensselaer Polytechnic Institute, he is a well-known jet engine and helicopter designer and inventor with more than 20 years' experience in designing, researching, and developing in the two fields. A figure in helicopter history since its beginning in 1940, he served ten years with Sikorsky Aircraft as primary design and project engineer and later was chief of preliminary design at American Helicopter Corp.

In 1952, Gluhareff formed his own company to design and develop light jet engines. Two years later, he began work on the G8-2 engine and—via a trial-and-development procedure that is still actually continuing—he has refined it to a high degree of efficiency.

As early as 1956, Gluhareff had perfected his idea to the point where one five-pound jet engine, installed on the rotor-tip of a single-

A BPN Exclusive



The Gluhareff G8-2 pressure jet engine in both photo and cross section drawing. Shaded area indicates path of liquid propane; dotted area, the propane vapor; and widely-spaced dotted area, the actual combustion.

bladed helicopter, could lift him off the ground. As rapid as development has been in the aero-space field, today, five years later, this is still "a fantastic feat," according to an editor of Aircraft and Missiles, a sister publication of BPN. After this first helicopter, a two-engine, two-bladed strap-on model and a two-engine, two-bladed flying platform helicopter followed in rapid succession. Both devices were successfully flown.

About a year ago, a Florida helicopter pilot approached Gluhareff with a thought:

"On frosty nights, Florida citrus growers charter all available helicopters—at \$90 per hour—to fly over their groves to keep the air moving and prevent cold air frost pockets from forming. Why don't you come up with a better solution?"

Thus was born the Frost Protec-

tion Division of Gluhareff Helicopter. Soon, working models of both an orchard heater and a wind machine were undergoing tests.

Today, Gluhareff Helicopter is still a one-man operation. Gluhareff is an inventor, a designer, an idea man with sky-is-the-limit ideas that are down-to-earth. He is not interested in forming a big company to manufacture the products of his design board; would prefer to let someone else do this. With scores of patents already in his name, he is interested only in further design and development work.

Gluhareff is also a consultant. In the area which is the unquestioned center of the aero-space industry, Gene is frequently called in by top companies in—and out—of this industry. Among his current projects, for example, are a rotary parachute for re-entry of space vehicles and a ground effect machine or "air

car" for an internal combustion engine maker who wants to find new markets for his engine.

While Gene's Jet is not involved in either of these projects, propane will enter the latter and the possibilities are quite fantastic. This small, light, probably very inexpensive air car may be able to go as fast as 100 mph on perhaps as little as 10 hp. Radically different from other air cars, this first model has already achieved 45 mph on 12 1/2 hp and could go much faster; but Gluhareff wants to perfect the controls before he attempts higher speeds. The engine maker insisted gasoline be used for the first model, but Gluhareff assured us that future models would use propane—to eliminate toxic fumes, smell, and engine maintenance—and for safety.

Gluhareff is absolutely dedicated to the cause of propane. In his brochure, he states his reasons in no



Gluhareff test flies his two-bladed strap-on helicopter. Note the propane-carrying oxygen-type cylinders on his back.



Gluhareff test flies his flying platform. That inner-tube-like shape below him is a specially-designed fiber glass fuel tank.

Gene's Jet

uncertain or uncommon terms:

"Liquid propane is safe, easily controlled, inexpensive, and readily available. And it is one of the cleanest fuels."

But these qualities are only frosting on the cake, as far as Gluhareff is concerned. His primary reason for designing his jet engine around propane is what he calls its "double energy." We'll let him describe it in his own words:

"This is a pressure jet engine. An entirely different concept from conventional jet engines, it is not a turbine, a ram jet, or a pulse jet. Basically, it is a burner with sonic-synchronized intakes. It was designed specifically around liquid propane, primarily because it is a fuel with double energy, compressive energy and heat energy. The result is a simple system with weight and complexity eliminated.

"Here is how we put this fuel to work, using both energies. The first energy, the inherent pressure of propane in the tank, delivers the fuel to the engine, the first bonus being the elimination of the fuel pump, its weight, and its added complexity. The second bonus of this compressive energy is that the liquid fuel is automatically vaporized as it passes through the engine's heat exchanger. The third bonus is that the compressive energy ejects the fuel through a supersonic nozzle into the air intake ducts. The fourth bonus is that the high exit velocity of the fuel, as it travels from the nozzle

into the succession of air ducts, draws in outside air at a predetermined ratio, eliminating the need for an air compressor and a power source to drive it. When the fuel-air mixture reaches the combustion chamber, it releases its second energy, the heat of combustion."

While this heat causes the stainless steel combustion chamber and tailpipe to glow red hot, no flames are visible in the exhaust stream.

Getting down to specifics on the engine, it may be described as a "T" in which the upright "stroke" is way off center, the shorter arm of the cross-stroke being the front of the engine. This T measures 27½ in. high and 35½ in. wide. Looking at it in three dimensions, the upright portion is roughly oval in cross-section while the arms have a circular cross-section.

Still regarding the engine as an unbalanced T, let's run through its operation with an eye on the accompanying diagram. The fuel system is simply a pressure vessel and a fuel line that has a needle valve which acts as the throttle. Liquid propane is brought up to the engine via this fuel line, which is enclosed in the rotor blade in a helicopter or wind machine installation.

The liquid enters the engine through a fuel-line connection fitting on the under surface of the longer arm of the T, right next to the upright. This puts the liquid in the rear of the combustion chamber, which is the short arm of the T, the portion directly between the two arms, and a small part of the longer arm. The fuel-line fitting

delivers the liquid to a coil of tubing, which serves as a heat exchanger, vaporizing the fuel. The vapor then passes along an insulated line down the upright to the bottom of the T, where it makes an abrupt U-turn.

Immediately after the U-turn, the vapor squirts out of a tiny supersonic fuel injection nozzle at very high speed. The rapidly-moving vapor immediately picks up some air as it rushes into the flared mouth of an oval tube several inches long. From this first stage supercharger, as Gluhareff calls it, the vapor speeds through the second stage supercharger, another oval tube about a foot long and with a larger cross-section. Since there is an open area between the two tubes, more air is immediately sucked in.

This process is repeated when the vapor shoots into a still-larger-diameter, but shorter, oval tube, the third stage supercharger and diffuser. The diffuser spreads the mixture into the combustion chamber, where combustion is continuous, once the engine is started.

Initial ignition is by a model airplane spark plug drawing current from a small dry battery. This is adequate, since the ignition system is used only momentarily.

To start the engine, one merely turns on the ignition and opens the needle valve that serves as the throttle. The engine fires immediately and the ignition is turned off. To increase the output, the valve is opened farther. To stop the engine, the valve is closed. Consumption varies from 8 to 10 gal. per hour.

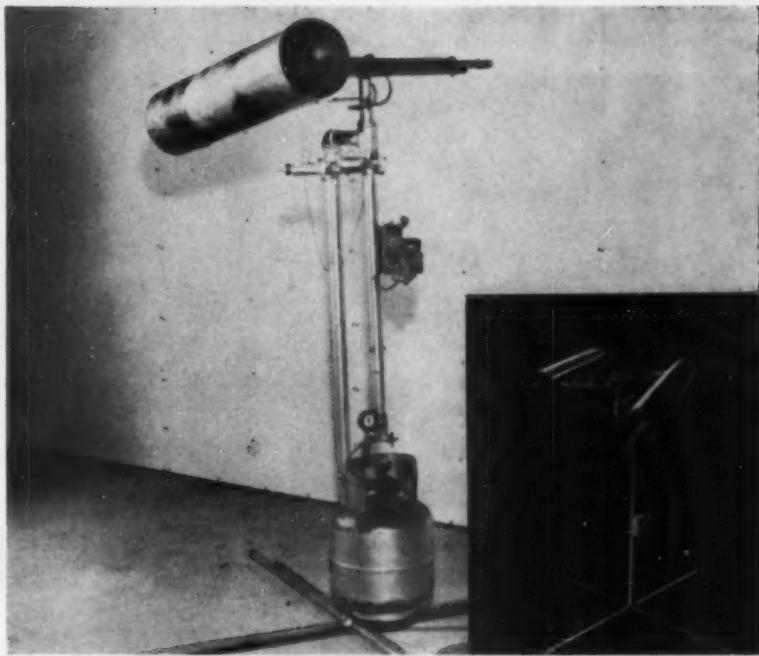
What is the power output? The standard measure of a jet engine's performance is thrust, since its horsepower varies according to the speed with which the engine is moving through the air. Gene's five-pound jet develops 15 lb. of thrust, which—under the best conditions—translates into a maximum of 15 hp. The best conditions, however, are at the end of a helicopter blade moving around at 375 mph. And drag of the engine and blade reduce the net available horsepower to a maximum of slightly over 8½ hp. This output is further reduced when the engine is moving through the air at slower speeds.

Gluhareff's three helicopters have all been test flown by their inventor. These flights, however, were tethered, the craft being restrained from flying very high or very far by cables. Gluhareff emphasizes that he is a designer, not a daredevil. He regards each of these devices as the first working model of its type. Each, he says, is now ready to be sold to a manufacturer who would refine the machine to an eventual production model.

What would these production models be like?

The strap-on helicopter probably would not differ too greatly from the first models, which have 10-ft rotors. Thus, the 70-lb two-bladed model would have a rotor span of 20 ft. The 60-lb, single-bladed model, which obtains balance through a counterweight, would be somewhat more compact. The possible military and industrial uses are readily apparent. An assortment of other applications is indicated by inquiries Gluhareff has already received.

The flying platform would probably cost in the neighborhood of \$10,000. It could develop along two different lines into two very different machines, an unmanned craft and a utility or pleasure air vehicle. The latter would be a helicopter counterpart of the private plane; but Gluhareff, though he has designs for such a craft, dismisses it as "too far off—at least 8 or 10 years." Much more immediate, he believes, are the industrial or military possibilities for the unmanned flying platform. He says this craft could serve as a space platform, re-laying communications signals at a tiny fraction of the cost of devices



The orchard heater (see inset), basically a jet engine in a galvanized shroud, would cost about \$330, heats one-half acre, could replace approximately 37 smudgepots. The proposed two-engine heater (large illustration) would double output to 2 million Btuh. It would not cover twice the area of the one-engine heater, but would provide a greater heat rise.

seriously proposed for such work. To cite one other possible use, he thinks the platform would be invaluable as a radio-controlled remote television camera platform, particularly for fighting forest fires, military work, etc.

While these helicopter applications seem to be the most efficient way to use Gene's Jet as a power source, there are certainly other possibilities, most of which are in the yet-unthought-of state. However, at the request of soaring enthusiasts, Gluhareff designed a two-engine installation for emergency use on gliders. He has also designed a really "far out" application, a jet surfboard.

So much for the straight power applications of Gene's Jet.

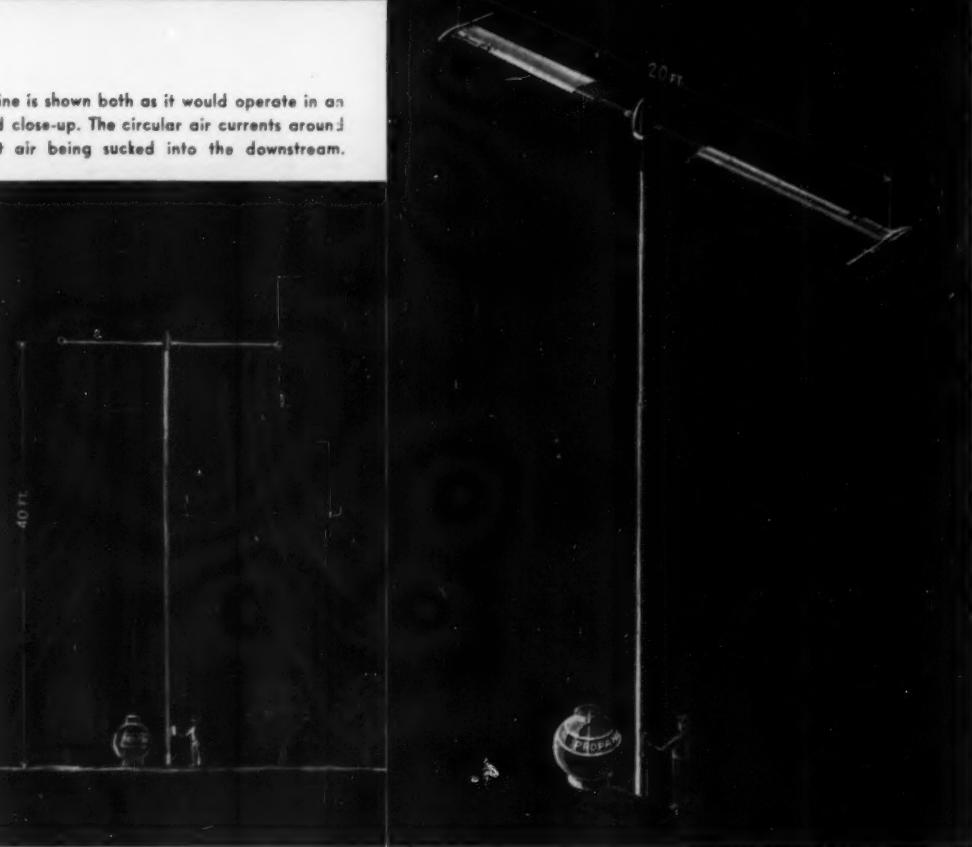
Since this engine puts out 1 million Btuh and moves this heat out of the immediate vicinity at a good velocity without any moving parts, heat applications seem to be "a natural." Therefore, there are also heat and heat-power applications, perhaps many of each type. Since Gluhareff has been experimenting in this field for only a year, he has only one application of each type, the orchard heater (heat) and the wind machine (heat-power). Let's

begin by taking a look at each heater individually.

The first orchard heater has been built, tested, and "costed out" to a prospective selling price. Gluhareff's conclusion is that two of his heaters, costing a total of approximately \$660, can replace 75 smudgepots costing \$1500. When you add to this the twin facts that two tanks and two fuel systems replace 75 tanks and 75 fuel systems and that clean-burning, fumeless propane replaces stench-producing oil, the selling points seem to be even more overwhelming.

The heater is simply an engine mounted parallel to the ground on a stand which incorporates a damper to slow the unit's revolutions to one every two minutes. To prevent radiated heat from rising straight up from the engine, it is shrouded in an 8-in. diameter galvanized pipe which is open at both ends. Tests by a nursery showed this unit would warm a circle 160 ft in diameter one degree or more. The "more," of course, is closer to the heater. At 25 ft from the unit, the temperature was raised 25 degrees; at 45 ft, 13 degrees; at 65 ft, 5 degrees; at 75 ft, 2 degrees; and at 80 ft, 1 degree.

The Gluhareff wind machine is shown both as it would operate in an orchard and in a detailed close-up. The circular air currents around the engines indicate hot air being sucked into the downstream.



Gene's Jet

Gluhareff also designed a two-engine heater which would double output to 2 million Btu. With engines pointing in opposite directions, it would turn 50 per cent slower to permit greater penetration. Since such a unit has not been built, its performance can only be estimated. Gluhareff believes it would cover a 220 ft circle and produce a considerably higher temperature rise than the one-engine.

The wind machine might be described as a helicopter that goes nowhere. There are two big differences between the two. In the wind machine, the rotors revolve around a solidly-anchored, 40-ft-high pole; and, the rotors do not change their pitch (angle to the ground), as they must do in a helicopter.

As shown in the accompanying diagram, the wind machine's primary function is to move air to prevent frost pockets from forming. However, some radiant and exhaust heat is sucked into the moving air. Gluhareff says tests with a trailer-mounted wind machine indicate it will protect a 10-acre area.

Much more impressive than that

fact, however, is a comparison with a ram jet wind machine under test by the State of California. Gluhareff says this machine costs \$8000 and the operating expense is 96 gal per hour. His machine, on the other hand, would cost only about \$1400 and would operate for about \$3 per hour!

With such apparent advantages, it is no wonder that several diversification-minded aero-space corporations are interested in Gluhareff's frost protection devices.

What does all this mean to the nation's LPG dealers? As best we can determine, it means five things:

1. Propane's unique qualities have been put to work with a completely unique device that displays these attributes more dramatically than they have ever been shown before. The big point is that this exciting jet engine is designed to run only on propane because propane allows it to be simpler, smaller, and lighter than any previous device of its type.
2. Two new and apparently vastly superior frost protection devices can go on the market as soon as some manufacturer decides to put them there; and they can mean a
3. Propane-powered jet helicopters produced in number are a definite possibility in the near future. They could conceivably prove to be a considerable load to a scattering of LPG dealers, but their more real benefit would probably be the general public's greater awareness of propane.
4. There are undoubtedly other commercial possibilities for this unique, inexpensive, light jet engine. What they will be depends strictly on the ingenuity of the American mind.
5. You can buy Gene's jet engine right now; and we can't think of a better buy as a promotional device for the average LPG dealer. What a crowd-puller it would be at fairs, what a traffic-builder for your showroom!

A reprint of this article can be obtained by writing on company letterhead to the Editor, BUTANE-PROPANE News, 198 S. Alvarado St., Los Angeles 57, Cal.

Monterey Park goes LPG

AFTER CONVERTING FIVE VEHICLES ON A TRIAL BASIS, the city of Monterey Park, a Los Angeles suburb, has decided to run all of its administrative and public works cars and trucks on propane.

A total of 32 vehicles will be converted over a three-year period. All six administrative sedans are being changed over now. Twenty-six public works vehicles will be converted at a rate not exceeding 10 per year. Old vehicles will be converted only if they have more than two years of anticipated life; new ones, upon purchase.

The decision to use propane was made strictly on a cost basis, propane being seven cents per gallon cheaper than gasoline in the quantities purchased by the city. Since the city will buy in 3600-gal. shipments, it is purchasing its own storage tank. The total conversion cost of \$12,000 to \$12,500, should be amortized in less than four years, since the city expects to save \$3,200 per year on the price differential.

However, there should be additional savings. Of the three vehicles tested for an extensive (three-month) period, two recorded significant mileage increases. A 2½-ton dump truck went up from 4.4 to 5.7 mpg when it was switched to propane and a 1½-ton pickup jumped from 7.4 to 10 mpg. The third, a ¾-ton truck, dropped slightly from 8.6 to 8.2 mpg. While acknowledging these "considerable" savings, the city felt that the trial period was "not sufficient" to be the basis for long-term fuel economy projections.

A third area of saving was also acknowledged, but — again — the trial period was too short to justify projections. Said the city manager's report to the Common Council:

"The automotive mechanic has stated that the engines of the propane-using vehicles are as clean and free of deposits as they were at the time of installation. This has great interest in terms of engine maintenance, since most automotive problems can be traced to such deposits."



E. G. Wolf, Jr.,
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9,000 GALLON T-1 TRANSPORT, New November, 1960, empty weight 18400. Priced at \$10,500. Mid-Continent L-P Service, Inc., Great Bend, Kansas.

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Pamphlet 58

(continued from page 44)

Division VII vehicles. Some of the remaining differences are taken care of by referring to other parts of the code, as is the case with Construction and Marking of Containers, 7.1, Description of a Division VII System, 7.2, and Container Valves and Accessories, 7.4. Really new material is confined to just three sections.

The first is section 7.5, Safety Relief Devices. Paragraph (c) states:

"The delivery side of the gas pressure regulator shall be equipped with a safety relief device as follows. When the delivery pressure from the final stage regulator is not more than 5 psig, the low pressure side shall be equipped with a relief valve, set to start to discharge at not less than two times and not more than three times the delivery pressure; but not more than 5 psi in excess of the delivery pressure. When the delivery pressure is more than 5 psi, the relief valve shall be set to start to discharge at not less than 1 1/4 times and not more than two times the delivery pressure. This requirement may be waived on liquid feed systems utilizing tubing specified in paragraph B.8 (b). The relief valve and the relief valve diaphragm shall be vented to the outside air and terminate at a position to minimize the possibility of vapors accumulating at sources of ignition."

The second section with new material is System Design and Line Pressure, 7.6. It states that systems may be either of the vapor-withdrawal or liquid-withdrawal type.

The third is Fire Extinguishers, 7.12. It specifies that mobile cooking units shall be provided with at least one portable fire extinguisher with a minimum rating of 8-B.C.

Division VIII

Devoted to "Liquefied Petroleum Gas Service Stations," this was formerly Division VII. Outside of completely renumbering all paragraphs, there is only one change. Paragraph 8.8 (e) prohibits the use of aluminum pipe or tubing. ■

CALENDAR

All associations
are invited to send
in the dates of their
forthcoming meetings

May 31-June 1—LPG Installations, Rural Fire Protection Conference—Cornell University, Ithaca, New York.

June 4-5—Butane-Propane Institute of Louisiana Annual Convention—Capital House Hotel, Baton Rouge, La.

June 4-6—Missouri-Illinois L. P. Gas Exposition—Sheraton Jefferson Hotel, St. Louis, Mo.

June 4-9—Florida LPGA Service Conference—University of Florida, Gainesville, Fla.

June 5-8—Iowa LPG Engine School—Iowa State University, Ames, Iowa.

June 6-8—Northeast LPG Carburetion Clinic—Pennsylvania State Farm Show, Harrisburg, Pa.

June 11-12—Colorado LPGA Convention—Harvest House, Boulder, Colo.

June 12—Arkansas L. P. Gas Dealer Association Convention—Hotel Lafayette, Little Rock, Arkansas.

June 20-22—LPGA Technical & Standards Committee meeting—Cosmopolitan Hotel, Denver, Colo.

June 20-24—Canadian Gas Association annual meeting—Banff Springs, Alberta, Canada.

June 21-23—L. P. Gas Training School—Purdue University, Lafayette, Indiana.

June 21-23—Texas Butane Dealers' Annual Convention—Adolphus Hotel, Dallas, Texas.

June 25-27—Montana and Wyoming LPGA Convention—Wort Hotel, Jackson, Wyo.

June 26-27—Minnesota LPGA Summer Convention—Grandview Lodge, Brainerd, Minn.

June 28-29—Michigan LPGA Convention—Blaney Park Resort, Blaney Park, Mich.

July 23-25—Kentucky LPGA Convention—Kentucky Hotel, Louisville, Ky.

August 6-8—New Mexico LPGA Convention—Western Skies Hotel, Albuquerque, N. M.

August 20-22—Idaho-Nevada-Utah LPGA Convention—Newhouse Hotel, Salt Lake City, Utah.

August 24-26—Florida LPGA Annual Convention—Hotel Robert Meyer, Jacksonville, Fla.

Sept. 15-17—Iowa LPGA Convention—The New Inn, Lake Okoboji, Iowa.

Sept. 22-24—Wisconsin L.P. Gas Convention—Schwartz Hotel, Elkhart Lake, Wis.

Sept. 24-26—Oklahoma LPGA Annual Convention—The Ramada Inn, Oklahoma City, Okla.

Oct. 2-4—AGA Convention—Dallas, Texas.

Oct. 23-24—Minnesota LPGA Fall Convention—Hotel Lowry, St. Paul, Minn.

Oct. 30-Nov. 1—NFPA Fall Conference—Hotel President, Kansas City, Mo.

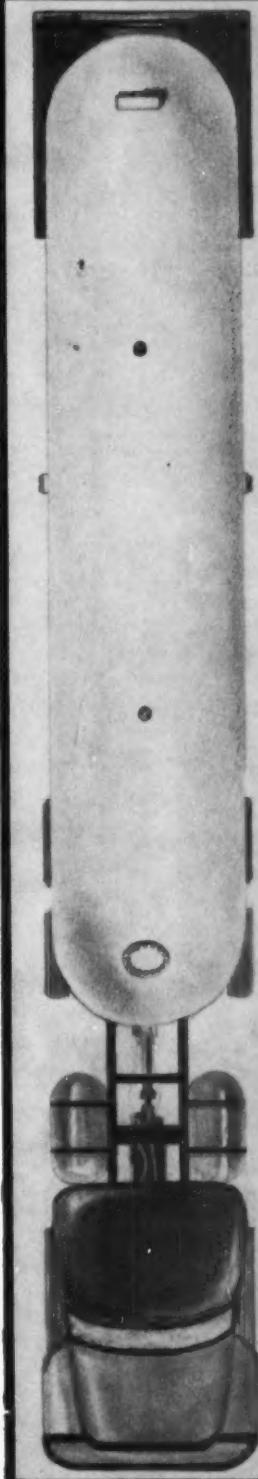
Nov. 13-15—American Petroleum Institute annual meeting—Conrad Hilton, Congress, and Palmer House Hotels, Chicago, Ill.

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